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The Medical Epitome Series.

PEDIATRICS.

A MANUAL FOR STUDENTS AND PRACTITIONERS.

BY

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AUTHOR'S PREFACE.

THE study of diseases of children has been given its proper place in the medical curriculum of most colleges in this country, and the need of a condensed book which will aid the student in acquiring command of this important subject is evident. The general form of the series has been adhered to by inserting at the conclusion of each chapter a list of questions which will enable the student to grasp better the important facts presented.

As an epitome is a selection and concentration of accepted knowledge, originality is neither possible nor desirable. Accordingly the standard works have been consulted, and acknowledgment is here made to Holt, Rotch, the *American Text-Book of Diseases of Children*, Jacobi, Corlett, Nothnagel's *Encyclopedia*, Sachs, Ashby and Wright, Cotton, and others.

The subject of *Infant Feeding* has been fully discussed because of its great intrinsic importance and its instructive development in current medical literature.

H. E. T.

LOUISVILLE, KY., 1904.

82505

EDITOR'S PREFACE.

In arranging for the editorship of *The Medical Epitome Series* the publishers established a few simple conditions, namely, that the Series as a whole should embrace the entire realm of medicine; that the individual volumes should authoritatively cover their respective subjects in all essentials; and that the maximum amount of information, in letter-press and engravings, should be given for a minimum price. It was the belief of publishers and editor alike that brief works of high character would render valuable service not only to students, but also to practitioners who might wish to refresh or supplement their knowledge to date.

To the authors the editor extends his heartiest thanks for their excellent work. They have fully justified his choice in inviting them to undertake a kind of literary task which is always difficult—namely, the combination of brevity, clearness, and comprehensiveness. They have shown a consistent interest in the work and an earnest endeavor to coöperate with the editor throughout the undertaking. Joint effort of this sort ought to yield useful books, brief manuals as contradistinguished from mere compends.

In order to render the volumes suitable for quizzing, and yet preserve the continuity of the text unbroken by the interpolation of questions throughout the subject-matter, which has heretofore been the design in books of this type, all questions have been placed at the end of each chapter. This new arrangement, it is hoped, will be convenient alike to students and practitioners.

V. C. P.

NEW YORK, 1904.

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PEDIATRICS.

CHAPTER I.

THE NEWBORN INFANT.

RESPIRATION.

As soon as the child's head is born it makes an attempt at inspiration. For this reason its mouth should be swabbed out to prevent inspiration of mucus and fluid. As soon as the body is born the first inspiration is taken, which dilates the previously impervious air-cells and assists in changing the fetal circulation. The skin quickly assumes a red color. The respirations are at first irregular, interrupted by crying, and when quiet are shallow and mostly diaphragmatic, with occasionally a full, deep inspiration. The chest-wall is gradually more and more expanded. The **rate** during the first few hours is 50 per minute, later averaging about 30.

Should respiration not be spontaneous and asphyxia be present, the first may be aided by various procedures termed **artificial respiration.** These are: the method of **Sylvester,** child on back, shoulders raised, arms drawn up over head for inspiration, down over chest, making compression, for expiration; that of **Schultze,** child supported by fingers in axillæ, back to operator, legs and pelvis thrown upward and forward, compressing chest by pressure on diaphragm, for expiration, allowing child to assume first position for inspiration; that of **Byrd-Dew,** holding child on back in palms of hands, head supported by one hand, bending child on itself for expiration, arching back by raising ulnar surface of hands and allowing head to fall back, for inspiration; that of **Laborde**, regular traction on tongue with head thrown back; and the **dilatation of the sphincter ani.** In **mouth-to-mouth insufflation,** the lips of the child being covered with gauze, the operator forcibly blows into the child's mouth by applying his lips closely to the child's. Inspiration should not be induced more than 20 times to the minute.

CIRCULATION.

The **chief changes in the circulation of the child after birth are**: closure of the foramen ovale; obliteration of the ductus arteriosus, ductus venosus, and the hypogastric arteries, and disappearance of the Eustachian valve.

The **hypogastric arteries,** which are named the **umbilical arteries** in the cord, are obliterated in that part extending from the fundus of the bladder to the navel as soon as the cord is ligated; that portion from the internal iliac to the bladder remains pervious as the superior vesical artery.

The **foramen ovale** closes about the tenth day, mostly from a reduplication of the endocardium of the left auricle; the **Eustachian valve** disappears at once.

The **umbilical vein** and the **ductus venosus** are closed about the fifth day, the latter remaining as the round ligament of the liver.

The **ductus arteriosus** is impervious about the sixth day, and remains as a cord attaching the heart to the aorta.

The **pulse** in the newborn ranges in frequency from 130 to 150, believed by some to be faster in girls than in boys, and in young infants. The average during the first week is 130; it is faster when the child is awake and is excited.

The **skin** of a child at birth is covered with a cheesy, varnish-like coating, **vernix caseosa.** This material is composed of epithelium, lanugo, and secretion from the sebaceous glands. It can only be removed after thorough inunction.

Lanugo is the fine, downy hair which covers the body at birth; it is soon rubbed off, and with it there is desquamation of the superficial skin in various parts of the body.

The **hair of the scalp** is shed during the first six weeks as a rule, being replaced by a finer and softer growth. It drops out first from the back of the head, which comes most into contact with the pillow.

The **temperature** of a newborn baby is always elevated several degrees, its rectal temperature during the whole of infancy registering in the neighborhood of 99° to 99.5° F. It is easily chilled, especially during the first few hours, and should be guarded against exposure.

The **first excretions** of the infant are peculiar to this time of life. **Meconium**, the first excretion from the bowel, is a black, tarry substance, made up of bile, epithelium, mucus, lanugo, salts of urea, fat-globules, and crystals of cholesterin. The stools assume the normal yellow color during the first week. The **urine** is usually thick and highly colored, leaving a stain on the napkin and frequently small, fine particles called **uric acid sand.** The urine later is watery in appearance and of a low specific gravity. There may be an accumulation of this sand in the kidney, **infarcts**, which cause pain in their passage through the ureter and the urethra.

The **blood** at birth is proportionately less in amount than in the adult; somewhat venous in appearance when in bulk; the amount of hemoglobin is greater, but the fibrin is less, there being a decrease in hemoglobin and an increase in fibrin after a few months, the hemoglobin reaching its lowest point at one year of age. The number of red cells is proportionately larger in the newborn, but there is a day-to-day fluctuation. It is said that the relative percentage of lymphocytes in the newborn is three times as great as in the adult; there is an increase in the eosinophiles. After a few months the child has relatively more blood in proportion to its weight than the adult.

The **weight** of boys at birth averages nearly 8 pounds; that of girls about 7½ pounds. During the first week the child will lose from ¼ to 1 pound in weight, but by the end of the second week it should have regained its birth weight. By its weight the progress of the child's nutrition may best be gauged. It should have a minimum gain of 4 ounces a week. Artificially fed infants gain at first more slowly than those breastfed, but later make satisfactory gains.

The **length** averages 46 cm. (18 or 20 inches). The circumference of the head measures about 35 cm. (14 inches); of the thorax, 33 cm. (13 inches); of the abdomen, 36 cm. (14 inches). The circumference of the chest may be calculated, if the length is known, by halving the length in centimeters and adding 10.

QUESTIONS.

What changes occur in the lungs and the circulation as the result of the first inspiration?

Name and describe the various methods of artificial respiration.

What is a newborn baby's temperature?

What is vernix caseosa? Lanugo? Meconium?

In what particulars does the blood of the infant differ from that of the adult?

What is the infant's birth weight? Length, head, and chest measurements?

CHAPTER II.

ANATOMY OF THE INFANT.

THE infant's anatomy differs from the adult's in many essential points. The **head** is soft and compressible; the bones are ununited, separated by sutures, the points of their coalescence being the anterior and posterior fontanelles. As a result of moulding during labor the head at birth is much misshapen, but regains its normal contour in a few days. The **frontal** bone is divided into two equal parts by the frontal suture; the **sphenoidal** and **temporal** bones consist of three pieces each, easily separated; the **mastoid cells** are not present; the halves of the **inferior maxilla** are united by fibrous tissue at the chin.

The **spine** is very flexible, the bones at this stage being mostly cartilaginous, the nuclei of ossification being present. **Spina bifida** results from a failure of the laminæ to unite, through which opening membranes of the cord protrude. It is said that the **clavicle** is the first bone in the body to ossify, being practically ossified at birth. The upper extremities are much better developed than the lower, as the fetal circulation provides a venous blood to the lower extremities.

The **larynx** is higher than in the adult, and it is not difficult to obtain an ocular view of the epiglottis and opening into the trachea. The bifurcation of the trachea is at the third (?) lumbar vertebra, higher than in the adult, its calibre being about the size of the infant's first finger; the opening into the right bronchus is the larger.

The **thymus gland** is an organ but little understood; it is situated partly in the thorax and partly in the suprasternal region. Its undue development is thought to be responsible in some cases for sudden death. The **bronchial glands** are found along the trachea, at its bifurcation, and around the larger bronchioles.

The **umbilical opening** may remain patulous at birth, through which intestines may protrude. A few cases are on record in which the ligature of the cord included a part of the intestine thus protruded. The **stump** of the **umbilical cord** usually separates from the fourth to the seventh day, but may remain attached as long as twenty days.

The **stomach** at birth is more like a dilated end of the esophagus, the left lobe of the liver pushing it over so that it assumes more of an upright position, making regurgitation of its contents easy. Its capacity is but an ounce. There is no constriction at the cardiac opening.

The **sigmoid flexure** is nearly as long as the rest of the **colon** and lies mostly in the abdominal cavity. The growth of the colon later is at the expense of the sigmoid flexure to a great extent.

The **pelvis** is very shallow and narrow.

The **liver** is one of the heaviest organs in the body, its relative weight as compared to the body being as 1 is to 18. Its growth and early development are due to the early supply of the freshly oxygenated placental blood.

The **kidneys** on section may show uric acid infarction; they are about on a line with each other, and may be coalesced, forming the horseshoe kidney. Their surface has a distinctly lobulated appearance.

FIG. 1.

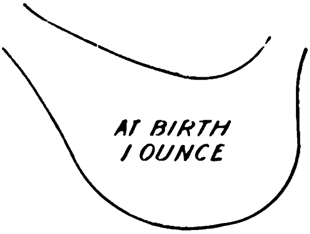


FIG. 2.

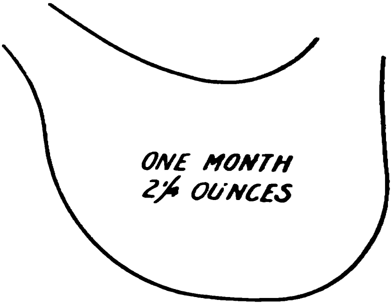
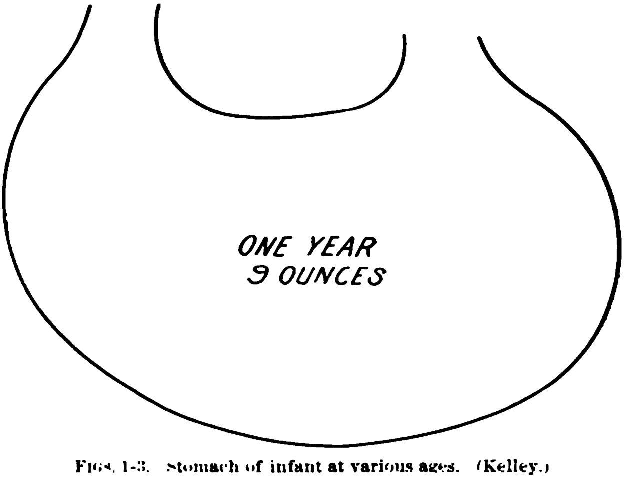


FIG. 3.



FIGS. 1-3. Stomach of infant at various ages. (Kelley.)

The **brain** is developed quite early, at birth closely resembling the adult brain in shape; its relative weight is as 1 is to 8; its color is quite pale, and it is soft because of the large percentage of water it contains. The gray matter appears after the first month.

The **testicles** descend during the last month of intra-uterine life and should be in the scrotum at birth.

The various **secretions** at birth are but few, occurring from the mucous surfaces quite early.

The **urine** is passed before birth; **bile** is also present, and may be demonstrated in the liquor amnii; **intestinal mucus** is present; **gastric juice** is small in amount, but able to digest casein; **saliva** is not present until the third or fourth month after birth, then only from the parotid gland; it later is secreted by the submaxillary gland.

QUESTIONS.

Describe the infant's skull.

What is spina bifida?

Describe the trachea; the thymus gland.

What is peculiar to the location and shape of the infant's stomach, sigmoid flexure, liver, kidneys, brain?

What secretions are present at birth?

CHAPTER III.

DEVELOPMENT OF THE CHILD.

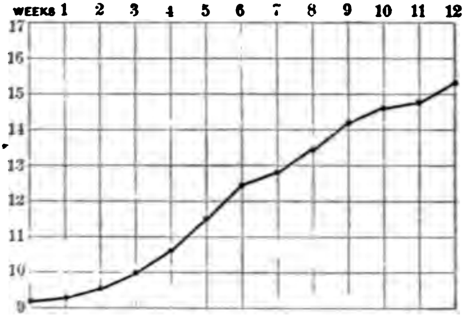
THE development of the child is influenced to a great extent by heredity, its environments, its nourishment, and the intelligence displayed in its care.

The **weight** is of the greatest importance in determining the child's growth, especially if artificially fed. Weekly weighings until the child is six months old, then every two weeks until a year of age, should be the rule. These should be recorded on a specially devised weight chart, as shown in Fig. 4.

The average **length** of the newborn is 52 cm., the most rapid gain in weight being during the first year, increasing in length about 20 cm., during the second year growing 10 cm., the average yearly gain, until the eleventh year, when it is about 8 cm.

The **child's first years** are generally divided into the following periods: early infancy, infancy, childhood, and youth; early infancy ends with the twelfth month; infancy, until the completion of dentition, about two and a half to three years of age; childhood, from this time until puberty.

FIG. 4.



Normal gain in weight during first twelve weeks.

FIG. 5.

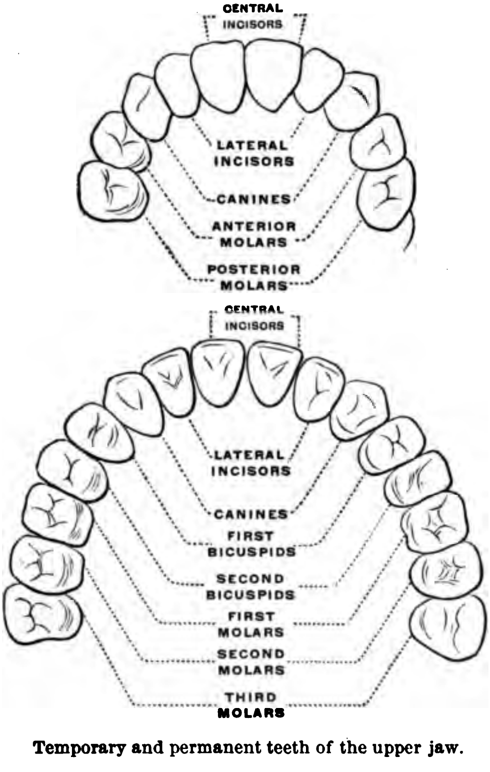
Scales and basket, suitable for the daily observation of babies' weights.

Disturbances of growth, evidenced by dwarfing, stationary weight, etc., indicate defective nutrition as a rule.

The **circumference of the head and chest** are about the same at birth, the head being from 1 to 2 cm. larger; at the third year they are equal, and from this time the chest is larger.

Dentition is the process of eruption of the teeth.

FIG. 6.



Temporary and permanent teeth of the upper jaw.

The teeth are formed in the jaws about the sixth week of intra-uterine development, and as soon as the crown is completed and the root begins to harden the teeth are forced up through the gum by the gradual development of the root.

The teeth first cut are the **temporary**, **milk**, or **deciduous** teeth; these are shed after the sixth year, giving place to the **permanent** teeth. A child may rarely be born with teeth. **Delayed** dentition is a frequent sign of rickets. Dentition is a normal process and should not cause symptoms of disturbance, but under certain conditions may do so.

The deciduous teeth are 20 in number, 10 in each jaw, and appear as follows as a rule:

6 to 9	months,	two lower central incisors.
7 to 10	"	four upper incisors.
12 to 14	"	two lower lateral incisors.
12 to 16	"	two anterior upper molars. two anterior lower molars.
18 to 24	"	two upper canines (eye teeth). two lower canines (stomach teeth).
24 to 30	"	two upper and two lower posterior molars.

During the first twelve months the child should cut 6 teeth; during the next six months 6 or more; at two years should have 16 teeth, and at two and a half years the full quota, or 20 teeth.

About the sixth year the permanent teeth are cut, following closely after the shedding of the milk teeth, 20 occupying the site of the deciduous teeth, with the addition of 12 molars behind these. The first of the permanent teeth to appear are the first or six-year molars, the central incisors falling out about this time. The following is the usual order of eruption of the permanent teeth:

4 first molars	6 years.
4 central incisors	7 "
4 lateral incisors	8 "
4 first bicuspids	8½ to 9 years.
4 second bicuspids	10 years.
4 canines	11 "
4 second molars	12 to 13 years.
4 wisdom teeth	18 to 25 "

THE DEVELOPMENT OF THE SENSES.

Sight is first shown by the sensitiveness to light, and in a few weeks the child's eyes will follow an object as it is moved before them. **Hearing** is very acute during the early months, but just after birth, there being no air in the tympanum, the child is deaf. **Smell** is one of the latest developed senses. **Taste** is highly developed from birth, the child readily distinguishing milk from water. **Touch** is acute in the lips and tongue, but not until about the third month is its sensibility to pain manifested over the body. **Reflexes** control the movement of the child at first; later they become more voluntary. **Speech** at first is an inarticulate murmur; gradually the voice is modulated; at the end of the first year single words are spoken, are quickly joined with other words and complete sentences formed.

QUESTIONS.

What is the average length of an infant?
How is early life divided ?
Describe dentition.
Describe the development of the senses.

CHAPTER IV.

THE CARE AND EXAMINATION OF INFANTS.

THE CARE OF THE INFANT.

The infant should have a daily bath, its first bath being by immersion after thorough inunction with an oily substance (olive oil, vaselin, or lard) to soften and remove the vernix caseosa. The temperature of the water should be from 98° to 100° F. Until the cord separates, subsequent baths should be on the nurse's lap using a sponge or soft cloth. Daily tub baths should be the rule subsequently. Later the temperature of the bath should not be below 96° F. The **room** should be warm and the child protected from **drafts**.

The **clothing** should be light and warm, and sufficiently loose not to constrict the body. Tight **bands** should never be applied; shirts with sleeves and sufficiently long to cover the abdomen should be worn next the skin. Flannel skirts of sufficient length to cover the legs and of sufficient weight to protect them from chill should be worn.

The **eyes** need careful attention. As soon as the head is born, they should be washed out with a saturated solution of boric acid, and this swabbing should be part of the daily bath each morning. For the prevention of **ophthalmia neonatorum** the instillation of 1 drop of a 2 per cent. silver nitrate solution in each eye is effective. This is the original **Crede** treatment. At the present time many authorities use a 1 per cent. solution of silver nitrate for the eyes, because the stronger mixture is apt to cause very active inflammatory reaction. The 1 per cent. solution, moreover, is sufficiently effective against the gonococcus. Protargol solution may also be used.

The **mouth** should be washed out before the child inspires, to prevent aspiration of mucus and fluid, and before and after each nursing, to prevent **thrush or sprue.** Boric acid in saturated solution is the best remedy. The **teeth** from the time of their eruption should be carefully cleansed with a cotton swab before all the temporary set have been cut, and with a small tooth-brush later. **Carious teeth** should be either filled or removed.

The **skin** at birth is covered with the **vernix caseosa.** It is quite sensitive and subject to inflammation upon the slightest irritation. Eczema frequently develops in the newborn and in infancy. Where the buttocks rub together, if the skin becomes softened from inattention to the irritating discharges, there develops an **intertrigo** which is difficult of cure. Napkins after they have been once soiled or urinated upon, should not be used until washed. A normal salt solution, or a solution of bran, is of advantage in washing extra-sensitive skins. Talcum and other bland absorbent powders can be freely used with benefit upon a baby's skin.

The **genital organs** need attention early, cleanliness being of the greatest importance. In the male the **prepuce** should be reflected at the end of a month or six weeks, stretching the foreskin sufficiently to uncover the glans. If this is done in the early months, circumcision will not be necessary. It should be regularly reflected once a week as part of the toilet and the accumulation of cheesy material, **smegma**, which is found in the groove behind the corona, carefully removed.

Regular habits and early establishment of voluntary control of the **rectum** and **bladder** are most important. An infant at twelve months should be able to control its **bowels**, and at three years should have control of its **bladder** day and night.

A newborn infant should **sleep** twenty hours out of the twenty-four, and its sleep should *not* be disturbed. A child sleeps less as it grows older, requiring about fourteen hours at two years of age, all night and a nap during the day, and at four years of age about twelve hours are required.

Feeding should be regular, every two hours during the day until three months of age, and every three hours at night. After three months the feedings should be every three hours during the day, and not more than once between 10 P. M. and 7 A. M., and after six months no feeding at night. The importance of **regularity** cannot be too strongly emphasized. Failure to observe this rule results in indigestion and malnutrition.

The **nursery** should be bright and airy, and contain from 1000 to 12,000 cubic feet of air space. A newborn infant may be taken out of doors in the summer when a week or ten days old, properly protected, and in winter should be taken into a room which has been recently aired. The temperature of the room in which it is kept should not be above 72° F., nor allowed to fall below 60° F. day or night.

The child should never be allowed to sleep with its mother, a separate crib without rockers being provided. Rocking and walking an infant early establish a desire for this motion, a habit not easily broken.

Premature infants require special attention. A child is said to be viable, able to maintain an existence without the aid of the mother, after the seventh month. A popular belief exists among the laity that a seven months' child is more apt to live than an eight months' child, a fallacy which is apparent to the most superficial thinker.

Maintenance of the infant's body heat and its nourishment are prime factors in its care. In premature infants an incubator or couveuse may be used to maintain the heat, and feeding with breast milk when obtainable either by bottle, from the breast, by a medicine-dropper or by gavage.

Gavage consists in the introduction of a catheter into the stomach, through which the milk is poured, the catheter being then quickly withdrawn. This procedure is also efficacious in the obstinate vomiting of infants.

THE EXAMINATION OF INFANTS.

One of the principal methods of diagnosis is by **physical examination**, employing all the methods at our command—inspection, auscultation, palpation, and percussion.

The **inspection** should be with the child asleep and awake, when crying and while quiet, remembering that before seven years of age a child differs from adults in almost every characteristic.

The history given by a mother or intelligent nurse is of the greatest assistance in arriving at a diagnosis, next in importance to the information gained from an **investigation** of the child. The method of greatest help in diagnosis is by **exclusion**, bearing in mind the various acute diseases to which the child is liable and eliminating these; those less so, and finally the rare diseases. The importance of accurate records in history-taking cannot be too strongly emphasized, going into the minutest details as to the etiology and course prior to first seeing the child. Previous illnesses should be chronicled, dentition, bowel troubles, facts as to growth, and an accurate history taken of the present illness. If the ailment is of the bowels, the napkins should be inspected by the physician in every case as to frequency, color, consistence, constituents, odor, and reaction of the movement.

In the **examination** of the sleeping child note the position it assumes, whether natural and easy. Does it toss and moan?

Is the skin dry or moist? Do the alæ nasi dilate when breathing? Is there grinding of the teeth? Is there pallor or blueness of the skin? Are the feet warm, cold, or clammy? Count the pulse and respiration, as both are accelerated when awake or disturbed. Note the child as it awakens, its pupils, skin, whether quiet or peevish.

If the child is awake, the first examination cannot be satisfactory unless the child is undressed. Look for **eruptions.** Note the general **contour** of the body, the **joints,** the **glands,** the **cry.**

In cerebral affections the **cry** is shrill and spontaneous without a preceding moan; in bronchitis and pneumonia it is short, moaning, and accompanied with cough; in laryngeal inflammation or croup it is hoarse, strident, and brassy; in earache, shrill and continuous; in colic, spasmodic, accompanied by wriggling and tossing about if old enough; in scorbutus, pain on moving the joints.

Palpation is of value; it reveals the surface temperature, presence of rhonchi or rattles in the chest; state of the fontanelles and abdominal organs; presence of hernia, hydrocele, or retained testicles; tenderness over any point.

Always examine the throat in any illness. Note the state of the **tonsils** and **uvula,** and whether the **buccal** eruption of measles (Koplik) is present. Note the condition of the **tongue,** whether it is tied, coated, red and dry, pale, flabby and indented; look for the strawberry tongue of scarlatina.

The **temperature** should be taken by the rectum or in one of the flexures of the body, axilla, or groin. The wide variation between the external and the internal temperature makes it desirable always to use the rectum as the one sure means. This difference may be not fractions of a degree, but several degrees, because the skin may be cold, clammy, and subnormal, while the blood deep in the body may be elevated many degrees in temperature. The frequency and character of the **pulse** should be noted. This can be done either at the wrist, ankle, or over one of the temporal arteries; or the frequency of the heart-beat can be learned by auscultation of the heart.

QUESTIONS.

Describe the infant's bath.

What kind of clothing should be provided for the infant?

What is ophthalmia neonatorum? Describe its prophylaxis and treatment.

What skin lesions develop in the infant, and what are their prevention and cure?

How may circumcision be avoided?

How should feeding and sleep be regulated?

How should premature infants be cared for?

Name and describe the methods of physical examination of the child.

CHAPTER V.

INFANT THERAPEUTICS.

MEDICINE should never be given a child without a clear indication for its employment. Many of the illnesses of children are self-limited and terminate uninfluenced. **Prophylaxis** is of the utmost importance in infancy, especially as regards those disturbances arising from improper feeding. Give **palatable** drugs when possible, and prepare drugs and means for local treatment out of sight of the patient. **Pills** should not be given a young child. **Inunctions** are often efficacious. **Powders** should be dissolved when possible, or thoroughly suspended before administering. **Enemata** should never be given in large quantity, too often repeated, or under any but gentle pressure—force should never be used in their administration. **Baths**, sponge and tub, should be given with the temperature of the water accurately recorded. **Suppositories** are efficient, but should never be large. **Inhalation** is effectual, either direct or indirect. **Gargles** may be employed only by older children.

Among the special therapeutic agents may be mentioned **antipyretics**. cold baths, or sponging; local applications of ice; cold colon irrigation; cold pack; and drugs, of which the representatives of the coal-tar group are the most frequently employed—phenacetin, antipyrin, and antifebrin. **Stimulants**: alcohol in some form; heart stimulants, such as strychnine, nitroglycerin, digitalis. **Anodynes**: opiates, chloral, bromides, and belladonna. **Tonics**: iron, arsenic, nux vomica, quinine, and codliver oil. **Counterirritants**, in the form of blisters sinapisms, liniments, and poultices. **Douches, sprays, colon irrigations, inhalations, stomach-washing**, and **gavage** are useful to meet special indications.

QUESTIONS.

What form of medication is of special value in the child?

What are the methods for reducing fevers? The best stimulants? Anodynes? Tonics?

CHAPTER VI.

INFANT FEEDING.

BREAST FEEDING.

Mother's milk is the best **infant's** food. A newborn oaby should be put to the breast as soon as the mother's condition will permit, nursing regularly every two hours during the day, from 6 A. M. to 10 P. M., and every three hours during the night. Milk first makes its appearance about the end of the second day, the first secretion being **colostrum**, which, because of the large amount of proteid contained and the colostrum corpuscles, acts as a purgative. These corpuscles are large granular bodies, five times the size of a fat-globule of milk.

The child should not be allowed to sleep with the mother, as it often nurses most of the night and frequently unbeknown to the mother; the nursing should be from **alternate breasts**, if the supply warrants this, and the breast should be *emptied* in from *ten* to *fifteen* minutes, certainly not longer than *twenty* minutes. The strictest **asepsis** should prevail in all that pertains to the baby's diet. Water should be given frequently.

Various estimates have been placed on the **daily quantity** of milk secreted by a nursing mother; Holt gives the following table:

At end of the first week, 10 to 16 ounces (approximately 300 to 500 grams).

During the second week, 13 to 18 ounces (approximately 400 to 550 grams).

During the third week, 14 to 24 ounces (approximately 430 to 720 grams).

During the fourth week, 16 to 26 ounces (approximately (500 to 800 grams).

From the fifth to the thirteenth week, 20 to 34 ounces (approximately 600 to 1030 grams).

From the fourth to the sixth month, 24 to 38 ounces (approximately 720 to 1150 grams).

From the sixth to the ninth month, 30 to 40 ounces (approximately 900 to 1220 grams).

The **indications against nursing** should be well understood. These are few, the large number of artificially fed children demonstrating the fact that many mothers do not nurse their offspring for reasons of a social nature or others of less weight. Among the special contraindications may be mentioned **tuberculosis**; any **exhausting disease** just prior to delivery; **a pregnancy** developing during lactation; **puerperal eclampsia**; **excessive hemorrhage** after labor; **fissured nipples**; **chorea**; **epilepsy**; **nephritis**, or a milk which persistently disagrees with the infant and cannot be changed in its composition.

The **quantity** of milk generally fails before the **quality**, though both may be at fault. A child that is getting an insufficient supply will show an irregular gain in weight; short naps after nursing, being quite restless until the next nursing because unable to get a full supply. If the supply seems adequate and the child shows signs of hunger, the milk should be examined. The specimen should be obtained from the middle of a nursing, the fore-milk being poor in fat, the strippings containing much fat. By means of Holt's apparatus this can be easily and accurately accomplished. This consists of a lactometer and a cream gauge, the latter being a glass cylinder holding 10 c.c., and is filled with milk to the zero mark, after the specific gravity has been taken at the proper temperature. This is allowed now to stand for twenty-four hours at a temperature of 70° F., at the end of which time the percentage of cream is read off the graduated tube. The **fat** is three-fifths of the cream. Having the **specific gravity** and the **cream**, and knowing that sugar is practically constant, the **proteids** can be calculated fairly accurately by the following rule: high specific gravity, high proteids; high fat, low specific gravity. If the fat is high and the specific gravity high (above 1031), the proteids are very high; if the fat is high and the specific gravity normal, the proteids are high; if the fat is low and the specific gravity high, the proteids are normal; if the fat is low and the specific gravity normal, the proteids are low; if the fat is low and the specific gravity low, the proteids are very low—a very poor milk.

To estimate simply the percentage of fat, the **Babcock centrifugal machine** is of the greatest assistance. **Marchand's tube** is also of service for estimating the fat, ether being used to extract the fat and alcohol to precipitate it. The amount of this deposit is then read off from the graduated portion of the tube according to a table furnished with the tube.

Having found a milk deficient in quantity or quality, the question arises, May it be made normal? Very often it may be made to agree with the child. A nursing woman's diet should be general and most nutritious; she should drink a large quantity of water, and of milk when that is possible, which as a milk-producer far excels beer, malt, or any of the alcoholics. Somatose is an excellent galactagogue; nutralactis is frequently of service also.

To regulate the various ingredients of mother's milk, Rotch suggests as follows: To **increase the total solids**, shorten the nursing intervals, decrease the exercise and the proportion of liquids, and increase the solids in the mother's diet. To **increase the fat**, increase the proportion of meat, and the opposite to **decrease the fat**; to **increase the proteids**, decrease the exercise; to **decrease the proteids**, increase the exercise to the point of fatigue. Exercise should be taken by all nursing mothers.

Should a mother be unable to nurse her infant, the ideal

artificial food is the milk of a good wet-nurse, whose baby's age is the same or a few weeks older or younger. A wet-nurse that is suitable is very difficult to obtain; if successful in obtaining one, she should be judiciously examined for some latent trouble, such as syphilis, tuberculosis, etc., and her milk had best be tested by Holt's apparatus, or chemically. She should be from twenty to thirty-five years of age, healthy, with normal mouth, teeth, throat, glands, and tibias, and she should have healthy, serviceable breasts and nipples, and her own baby must be gaining. Her food must be plain and wholesome. Because of the walk of life from which a wet-nurse is generally obtained, the change of surroundings, method of living, and diet are apt to change the character of her milk enough to upset her own child, and probably her charge also, hence the importance of an examination of the milk after the change. Daily bathing of the nurse, regular exercise, cheerful surroundings, and no excitement should be her rules of life.

The question of **elimination of drugs** through the breast often arises. But few drugs taken by the mother can affect the nursing child. Among these may be mentioned opium, belladonna, potassium iodide, aloes, bromides, mercury, rhubarb, magnesium sulphate, and cascara sagrada.

The milk may also be changed in character by sudden nervous phenomena, passion, grief, exhaustion, excitement, and fright, causing symptoms of indigestion, prostration, perhaps convulsions in the child. The symptoms are said to be caused by colostrum, which has been found in milk after such excitement.

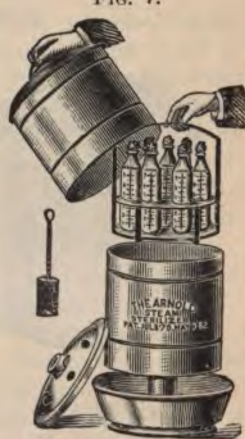
ARTIFICAL FEEDING.

Nature's food, a healthy breast milk, being unobtainable, a food must be chosen that has all the chief constituents of mother's milk. The milk of one of the lower animals being the only food which answers this requirement, the choice of the animal must be made. The milk of the cow, goat, ass, and mare has been used, but the cow is the only animal whose milk answers the chief requirements of artificial feeding—

cheapness, abundance of supply, ease of modification, that the resultant milk will approximately show the same chemical analysis of mother's milk.

A child suckled at the breast should be **weaned** at about ten months of age, or sooner if there are evidences of malnutrition. If it is evident the supply is inadequate, it may be given combined breast and artificial feeding. The child should not be weaned in hot weather, if it is possible to choose another season. It may be weaned **gradually**, giving two or three feedings in the twenty-four hours, gradually withdrawing the breast and increasing the number of artificial feedings, or the breast may be withdrawn suddenly.

Fig. 7.



The Arnold steam sterilizer for milk. This may be used for pasteurizing by removing the outer cover.

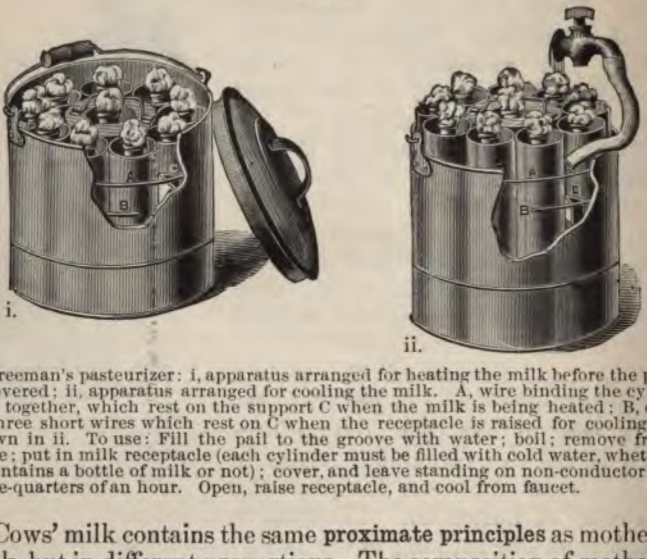
Cows' milk should answer the following requirements: it should be clean; from a herd; cooled before bottling, contain no preservatives; raw; of standard chemical analysis, and kept cool until delivered; from healthy animals; animals fed on fresh food, with no brewers' grain.

The requirements of the eastern "Milk Commissions" are that the milk contain less than 10,000 bacteria to the c.c., containing not more than 4.5 per cent. nor less than 3.5 per cent. of butter fat. The milk from one cow varies very much from one milking to the next, as much as 2.5 per cent. in the amount of fat alone, hence the advantage of a mixed herd milk. A milk from which the animal heat is not extracted by cooling is an excellent culture-medium for bacteria; in a milk submitted to high temperature for sterilization or Pasteurization, the coagulation of the milk albumin renders the milk more difficult of digestion, it interferes with the coagulability of the milk by rennet, and the free fat is not readily assimilated (Fischer).

The cows should be examined by a veterinarian and tested with tuberculin, and analysis of the milk made frequently.

Milk is **sterilized** by bringing it to a temperature of 212° F. for some minutes, and **pasteurized** by using as little heat as has been shown is necessary to destroy ordinary bacteria, 167° F. being ample for this purpose. Arnold's sterilizer and Freeman's pasteurizer are employed for these purposes. A **clean** milk needs neither sterilization nor pasteurization.

FIG. 8.



Freeman's pasteurizer: i, apparatus arranged for heating the milk before the pail is covered; ii, apparatus arranged for cooling the milk. A, wire binding the cylinders together, which rest on the support C when the milk is being heated; B, one of three short wires which rest on C when the receptacle is raised for cooling, as shown in ii. To use: Fill the pail to the groove with water; boil; remove from stove; put in milk receptacle (each cylinder must be filled with cold water, whether it contains a bottle of milk or not); cover, and leave standing on non-conductor for three-quarters of an hour. Open, raise receptacle, and cool from faucet.

Cows' milk contains the same **proximate principles** as mother's milk, but in different proportions. The composition of mother's milk is as follows (Holt):

Fat	4.00
Sugar	7.50
Proteids	1.50
Salts	0.20
Water	87.30

Specific gravity, 1028–1033. Reaction alkaline or neutral.

The analysis of cow's milk—average (Holt):

Fat	3.50
Sugar	4.30
Proteids	4.00
Salts	0.70
Water	87.00

Specific gravity, 1028–1033. Reaction neutral or slightly alkaline.

Comparison of Cows' Milk and Woman's Milk.—Woman's milk is more transparent and is alkaline, while cows' milk is apt to be acid or neutral; they both contain practically the same amount of fat and sugar, the latter being lactose in solution. It is in the proteids that the greatest difference is found, being greatly in excess in cows' milk and differing in character. The **proteids** include **caseinogen** and **lactalbumin,** the caseinogen being held in suspension in the emulsion by the lime phosphate, the lactalbumin being in solution. In cows' milk there is much more caseinogen than lactalbumin. The caseinogen being the coagulable substance of the proteid explains the large firm curds formed from cows' milk by the acids of the gastric juice; these dissolve slowly, and should be borne in mind in milk modification.

Upon the proteids depend growth and development to a great extent. Winters states that there is a definite and unfailing relationship between growth and percentage of proteid in milk, and a food rich in proteid and minerals is necessary during the period of a child's rapid growth.

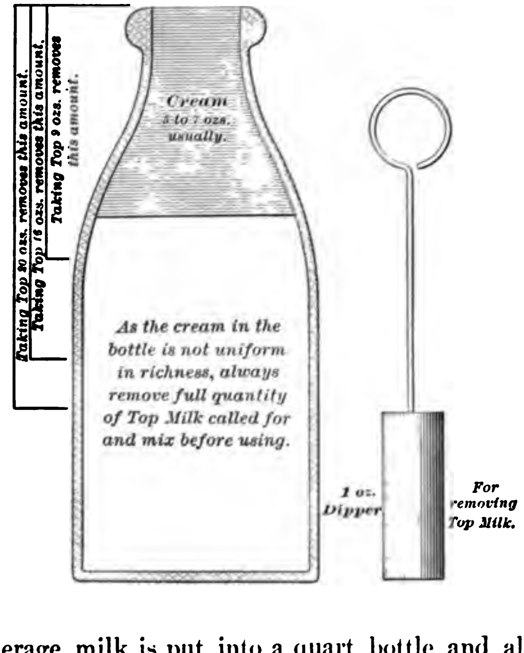
The **sugar** is more abundant in mother's milk than in cows' milk.

The **salts** in cows' milk are three and a half times as abundant as in mother's milk, there being an excess of calcium phosphate and sodium chloride.

Cream is a superfatted milk, and is obtained either by the gravity process, skimming after it has stood for four hours, or by the centrifugal process. It is claimed by some authorities that cream which has been separated can never be recombined with a milk mixture, that it is impossible to reunite it in the same homogeneous mixture it was before centrifuging. This process is also said to destroy the normal cohesive attraction of fat-globule and proteid.

Cream is generally spoken of as an 8 per cent., 12 per cent., 16 per cent., or 20 per cent. cream, thereby meaning it contains that amount of butter fat, there being practically the same amount of sugar, proteids, and salts in each.

FIG. 9.


Taking Top 20 ozs. removes this amount.
Taking Top 16 ozs. removes this amount.
Taking Top 9 ozs. removes this amount.
Cream 5 to 7 ozs. usually.
As the cream in the bottle is not uniform in richness, always remove full quantity of Top Milk called for and mix before using.
1 oz. Dipper
For removing Top Milk.

If average milk is put into a quart bottle and allowed to stand four or five hours, the upper 11 ounces will contain 10 per cent. of butter fat; the upper 16 ounces, 8 per cent. of fat. These may be obtained by siphoning off the bottom milk or by the dipper suggested by Chapin, with which is dipped off the topmost cream.

MILK MODIFICATION.

From Holt's table, page 39, it may be seen that the chief difference between mother's milk and cows' milk is in the quantity and quality of the proteids; the fat is about the same in both, the sugar rather more in mother's milk. Cows' milk must be diluted, then, to bring the percentage of proteids to that of mother's milk, but in diluting the proteids the fat and sugar are also diluted, and the process by which the proteids are lowered and the fat and sugar kept constant is called **modification of milk.** To obtain a proper conception of milk **modification,** it is necessary to appreciate the fact that one must think of a milk mixture as presenting so much percentage of a given ingredient, and not of how many ounces it takes to make a certain solution or how many times a given quantity of milk is to be diluted. One must think in percentages and not in ounces, and the basis of this is the average analysis of mother's milk and cows' milk, which must be constantly borne in mind.

The proteids are diminished by adding a diluent, water or the various gruels; and the fat and sugar raised by the addition of cream and milk-sugar. This may also be accomplished by the dilution of cream, the strength of which is known. To Rotch, of Boston, is due the credit of suggesting milk modification and the establishing of **milk laboratories,** where milk of given percentages may be obtained by prescription as one does medicine at a drug-store. Milk may be modified at home, where the Walker-Gordon laboratories are not available, according to many methods suggested by workers in this line. On page 42 is a form of prescription for use in milk laboratories.

At the laboratory may be obtained milk, pasteurized, sterilized, or raw; whole milk or modified milk; centrifugal or gravity cream, and any diluent.

Starr says as to babies fed on laboratory milk that theoretically it is the most perfect substitute for normal human milk, but experience puts the babies fed on this milk into three groups: 1, those that thrive satisfactorily—the minor por-

℞	Per cent.	Remarks.
Fat		Number of feedings
Sugar		Amount of each feeding
Albuminoids		Alkalinity .... %
Mineral matter		Heat at .... F.
Total solids		Infant's age
Water ad	100.00	Infant's weight

Order..

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Signature.

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tion; 2, the partially satisfactory, in which the children thrive for a while, but have to be placed on other foods for health conditions; 3, the unsatisfactory, in which class are placed the majority fed on laboratory milk in the first eight weeks of life.

Home modification may be accomplished in a variety of ways, some more or less complicated, but all aiming at the same end, viz., obtaining a milk which will analyze in the chief ingredients, fat, sugar, and proteids, as closely as possible to mother's milk.

The **method devised by Baner** is probably the most useful and practical; it is as follows: Determine the quantity to be fed in twenty-four hours and the percentage of the ingredients, and use the following formula:

$Q =$ quantity in twenty-four hours; $C =$ cream. (In the following equation if a 20 per cent. cream is used, 16 will be the divisor; if a 16 per cent. cream is used, 12 will be the divisor; and if a 12 per cent. cream is used, 8 will be the divisor.) $M =$ skimmed milk; $F =$ percentage of fat in the mixture; $P =$ the proteids, and $M. S =$ the sugar of milk.

$$C=\frac{Q\times(F-P)}{8\text{ (if 12 per cent. cream is used)}}$$

$$M=\frac{Q\times P}{4\text{ (}i.\ e.\text{, the proteids in cows' milk)}}-C$$

$$W=Q-(C+M).$$

$$M.\,S=\frac{(M.\,S-P)\times Q}{100\text{ (result being in ounces).}}$$

Let 20 ounces be the quantity to be fed in twenty-four hours (10 feedings of 2 ounces each) and the formula be: fat, 2; sugar, 6; proteids, 1; the equation will be as follows:

$$C=\frac{20\times(2-1)}{8}=\frac{20}{8}=2\tfrac{1}{2}\text{ oz.}$$

$$M=\frac{20\times 1}{4}-2\tfrac{1}{2}=5-2\tfrac{1}{2}=2\tfrac{1}{2}\text{ oz.}$$

$$W=20-(2\tfrac{1}{2}+2\tfrac{1}{2})=20-5=15\text{ oz.}$$

$$M.\,S=\frac{(6-1)\times 20}{100}=\frac{5\times 20}{100}=\frac{100}{100}=1\text{ oz.}$$

Ordinary gravity cream contains 16 per cent. of butter fat, and if 2 parts of this are added to 1 part of milk (containing 4 per cent. fat), 12 per cent. cream will be obtained.

Westcott has also devised mathematical formulæ for calculating milk mixtures as follows:

C = cream; M = milk; F = fat; P = proteids; L = lactose; T = total quantity; S = sugar.

$$C=\frac{(F-P)\,Q}{8.2\,(12\%\text{ cream})\text{ or }12.4\,(16\%\text{ cream})\text{ or }16.8\,(20\%\text{ cream})}$$

$$M=\frac{QF}{4}-3\,C\,(12\%)\text{ or }4\,C\,(16\%)\text{ or }5\,C\,(20\ \%)$$

$$L=\frac{QS-4.3(M+C).}{100}$$

If a 20 ounce mixture is desired, containing 3 per cent. of fat, 6 per cent. of sugar, and 2 per cent. of proteids, using 16 per cent. cream, the formula would read:

$$C = (3 - 2)\ 20 = \frac{20}{12.4} = 1.5 \text{ oz.}$$

$$M = \frac{2 \times 3}{4} - 4 \times 1.5 = \frac{60}{4} - 6 = 9 \text{ oz.}$$

$$L = \frac{20 \times 6 - 4.3\,(9 + 1.5)}{100} = \frac{120 - 45}{100} = \tfrac{3}{4} \text{ oz.}$$

Conversely, in order to determine the percentage of ingredients in any combination of cream, milk, and sugar, Westcott suggests the following:

To find percentage of fat:

$$\frac{C}{Q} \times 16 \text{ (or } 12) = \text{fat percentage from cream}$$

$$\frac{M}{Q} \times 4 = \text{fat percentage from milk}$$

Sum of these = fat percentage in mixture.

To find percentage of proteids:

$$\frac{C}{Q} \times 3.6\ (16\%) \text{ or } 3.8\ (12\%) = \text{proteid percentage from cream}$$

$$\frac{M}{Q} \times 4 = \text{proteid percentage from milk}$$

Sum of these = proteid percentage in mixture

$$\text{Sugar percentage} = \frac{100\,L + 4.3\,(M + C)}{Q}.$$

An illustration. Take the above mixture, 1½ ounces of 16 per cent. cream, 9 ounces of milk, ¾ ounce of lactose, and 19½ ounces of water:

$$\frac{1.5}{20} \times 16 = 1.2$$

$$\frac{9}{20} \times 4 = 1.8$$

$$3.0 \text{ per cent. total fat}$$

$$\frac{1.5}{20} \times 3.6 = 0.27$$

$$\frac{9}{20} \times 4 = \frac{1.80}{2.07} \text{ total proteids per cent.}$$

$$\frac{100 \times 0.75 + 4.3 \times 10.5}{20} = \frac{75 + 45.15}{20} = 6\% \text{ sugar.}$$

Hamilton's method is based on the fact that cream, milk, and skimmed milk contain relatively the same amount of proteids and salts:

Multiply quantity of the mixture by the percentage of fat desired and divide by the percentage of cream used, the quotient equals the amount of cream.

Multiply the quantity of milk mixture by the percentage of proteids desired, and divide by 4, the percentage of proteids in skimmed milk, subtract from this the amount of cream to be used, the result equals the amount of skimmed milk.

The quantity of cream and skimmed milk subtracted from the total quantity gives the amount of diluent. Three drachms of lactose must be added to each 10 ounces of the mixture.

Forty ounces of mixture desired, of the following formula: fat, 4; sugar, 7; proteids, 2; 16 per cent. cream.

40 × 4 ÷ 16 = 10 ounces of 16 per cent. cream.

40 × 2 ÷ 4 = 20 — 10 = 10 ounces of skimmed milk.

40 — 20 = 20 ounces of diluent.

Sugar = four level tablespoonfuls.

Lime-water, q. s.

The **method of Dr. H. D. Chapin** will be found of great practical value because of the readiness of calculation from the formulæ he has advised. Chapin, as the result of a number of analyses of average milk, has found that if 9 ounces are removed from the top of a quart bottle of milk after it has stood for four hours, this quantity of top milk will show 10 to 12 per cent. of butter fat; the top 11 ounces, 8 to 10 per cent. butter fat; the top half will analyze 6 to 8 per cent. of fat. He uses for this purpose a tin dipper with a wire handle holding just an ounce of milk; one dipper holds an ounce of granulated sugar and a dipper and a half represent an ounce of milk-sugar. Taking as a basis 20 ounces as the total quantity of the mixture, the following tables are suggested as analyzing the required formulæ:

Of the upper 11 ounces of top fat milk, 1 ounce is taken; milk-sugar, 1 ounce; lime-water, 1 ounce; and sufficient of the diluent chosen to make 20 ounces—the resultant mixture will analyze: fat, 0.50; sugar, 5.20; proteids, 2.17.

		Fat.	Sugar.	Proteids.
I.	1 ounce	0.50	5.20	0.17
II.	2 ounces	1.00	5.40	0.33
III.	3 "	1.50	5.60	0.50
IV.	4 "	2.00	5.85	0.66
V.	5 "	2.50	6.05	0.83
VI.	6 "	3.00	6.25	1.00
VII.	7 "	3.50	6.50	1.50

Of the upper 16 dippers containing 8 per cent. of fat:

		Fat.	Sugar.	Proteids.
I.	1 ounce	0.35	5.20	0.17
II.	2 ounces	0.70	5.40	0.35
III.	3 "	1.05	5.60	0.52
IV.	4 "	1.40	5.80	0.70
V.	5 "	1.75	6.00	0.87
VI.	6 "	2.10	6.20	1.05
VII.	7 "	2.45	6.45	1.22
VIII.	8 "	2.80	6.70	1.40
IX.	9 "	3.15	6.90	1.55
X.	10 "	3.50	7.10	1.70
XI.	11 "	3.85	7.30	1.92
XII.	12 "	4.15	7.50	2.70

Of 30 ounces of top milk:

		Fat.	Sugar.	Proteids.
I.	2 ounces .	0.40	5.40	0.35
II.	4 " . .	0.80	5.80	0.70
III.	6 " . .	1.20	6.20	1.05
IV.	8 " . .	1.60	6.70	1.40
V.	10 " . .	2.00	7.10	1.75
VI.	12 " . .	2.40	7.60	2.10
VII.	14 " . .	2.80	8.10	2.45
VII.	16 " . .	3.20	8.50	3.80

Winters gives the following formulas and indications for the home modification of milk:

Age of child.	Cream.	Sugar-milk.	Lime-water.	Water.	Composition of mixture.		
					Fat.	Sugar.	Proteid
First, second, and third days.	Upper ⅛ oz. each of 2 quarts.	⅝ oz.	1½ oz.	9 oz.	2.00	7.00	0.25
Fourth, fifth, sixth, and seventh days.	Upper ¼ oz. each of 3 quarts.	1 oz	2 oz.	10½ oz.	2.50	7.00	0.33
Second week.	2¼ oz. from 1 quart.	1 oz.	2 oz.	10½ oz.	3.00	7.00	0.50
Third week.	Upper 6 oz. from 1 quart.	1.8 oz.	4 oz.	18 oz.	3.50.	7.00	0.75
Fourth to eighth week.	Upper 9 oz. from 1 quart.	2 oz.	4 oz.	19 oz.	4.00	7.00	1.00
Ninth to twelfth week.	Upper 11 oz. from 1 quart.	1.9 oz.	4 oz.	17 oz.	4.00	7.00	1.25
Fourth month.	Upper 13 oz. from 1 quart.	1.8 oz.	4 oz.	15 oz.	4.00	7.00	1.00
Fifth and sixth months.	Upper 15 oz. from 1 quart.	1.7 oz.	4 oz.	13 oz. enough to make 1 quart.	4.00	7.00	1.75
Seventh, eighth, and ninth months.	Upper 17 oz. from 1 quart.	1.4 oz.	4 oz.	11 oz.	4.00	6.50	2.00
Tenth and eleventh months.	Upper 21 oz.	1.1 oz.	4 oz.	7 oz.	4.00	6.00	2.50
Twelfth month.	Upper 25 oz.	0.7 oz.	4 oz.	3 oz.	4.00	5.50	3.00

Table shows: 1st. Extreme range of composition of whole milk and top milks.

2d. Extreme range of composition of different dilutions of whole and top milks.

Milk containing 3 per cent. of fat is the poorest allowed by law in all but one state of the Union. Milk containing 5 per cent. of fat is rich Jersey milk. Practically all milk will vary between these extremes. Most bottled milk will contain a little less than 4 per cent. fat, 3.5 per cent. proteids, and 5 per cent. sugar, or about the mean of these extremes, so in making up feedings it is better to use the mean and not the extremes for whole and diluted milks and top milks, unless the milk is known to be either poor or very rich.

Dilution or proportion of milk in feeding mixture.	Per cent. of fat.								Per cent. of proteids.	Per cent. of sugar.
	Skimmed milk.	Poor milk. Whole milk. Rich milk.	Poor milk. Top 20 ounces. Fat 1½ times whole milk. Rich milk.	Poor milk. Top 15 ounces. Fat 2 times whole milk. Rich milk.	Poor milk. Top 11 ounces. Fat 2½ times whole milk. Rich milk.	Poor milk. Top 9 ounces. Fat 3 times whole milk. Rich milk.	Poor milk. Top 8 ounces. Fat 3½ times whole milk. Rich milk.	Poor milk. Top 7 ounces. Fat 4 times whole milk. Rich milk.	For skimmed, whole, or top milk. Poor milk. Rich milk.	For skimmed, whole, or top milk. Poor milk. Rich milk.
	0.50–1.00	3.00–5.00	4.50–7.50	6.00–10.00	7.50–12.50	9.00–15.00	10.50–17.50	12.00–20.00	3.00–4.00	4.00–5.00
1/8	0.06–.10	0.38–0.63	0.56–0.94	0.75–1.25	0.94–1.60	1.12– 1.90	1.30– 2.20	1.50– 2.50	0.38–0.50	0.50–0.63
1/7	0.07–.14	0.43–0.70	0.64–1.07	0.86–1.43	1.07–1.80	1.30– 2.10	1.50– 2.50	1.70– 2.85	0.43–0.57	0.57–0.70
1/6	0.08–.16	0.50–0.83	0.75–1.27	1.00–1.67	1.25–2.10	1.50– 2.50	1.75– 2.90	2.00– 3.34	0.50–0.66	0.66–0.83
1/5	0.10–.20	0.60–1.00	0.90–1.50	1.20–2.00	1.50–2.50	1.80– 3.00	2.10– 3.50	2.40– 4.00	0.60–0.80	0.80–1.00
1/4	0.12–.25	0.75–1.25	1.12–1.90	1.50–2.50	1.88–3.12	2.25– 3.75	2.62– 4.38	3.00– 5.00	0.75–1.00	1.00–1.25
1/3	0.16–.33	1.00–1.67	1.50–2.50	2.00–3.33	2.50–4.17	3.00– 5.00	3.50– 5.82	4.00– 6.66	1.00–1.33	1.33–1.67
2/5	0.20–.40	1.20–2.00	1.80–3.00	2.40–4.00	3.00–5.00	3.60– 6.00	4.20– 7.00	4.80– 8.00	1.20–1.60	1.60–2.00
1/2	0.25–.50	1.50–2.50	2.25–3.75	3.00–5.00	3.75–6.25	4.50– 7.50	5.25– 8.75	6.00–10.00	1.50–2.00	2.00–2.50
5/8	0.30–.60	1.90–3.10	2.80–4.70	3.80–6.30	4.70–6.80	5.60– 9.40	6.60–10.94	7.50–12.50	1.90–2.50	2.50–3.10
2/3	0.33–.66	2.00–3.30	3.00–5.00	4.00–6.60	5.00–8.33	6.00–10.00	7.00–11.70	8.00–13.50	2.00–2.70	2.70–3.30
3/4	0.37–.75	2.25–3.75	3.40–5.60	4.50–7.50	5.62–9.40	6.75–11.25	7.90–13.13	9.00–15.00	2.25–3.00	3.00–3.75

Pisek suggests the following scheme:

Age.	Feeding scheme.			Ingredients.			Approximate composition.		
	Number of feedings in twenty-four hours.	Size of feedings.	Feeding intervals.	Milk.	Predigested gruel.	Sugar.	Fat, per cent.	Proteids, per cent.	Sugar, per cent.
1 week . . .	9	1–2 oz.	2 hours	of 9 oz. top milk 2 oz.	13 oz.	½ oz.	1.50	0.80	7
2–4 weeks .	9	2–3 oz.	2 "	use 4.6 oz.	24 oz.	1 oz.	2.00	0.95	7
1–3 months .	8	3–4 oz.	2–3 "	Top 9 oz	24 oz.	1 oz.	3.00	1.10	7
3–6 " .	6	4–6 oz.	3 "	Top 16 oz.	24 oz.	1 oz.	3.00	1.50	7
6–9 " .	6	6–8 oz.	3 "	Top 20 oz.	20 oz.	1 oz.	3.00	1.80	7
9–12 " .	5	8–9 oz.	3½ "	1 quart whole milk.	12 oz.	1 oz.	3.00	2.50	6
12–18 " .	5	9–10 oz.	3½ "	2½ pints whole milk.	8–12 oz.	1 oz.	3.20	2.60	6

Connors suggests that as it is possible to obtain from a quart bottle of milk, after the cream has risen, about twenty-five different mixtures of cream and milk, a key is needed that will enable those unfamiliar with the subject to tell at a glance how to make up any mixture and how to shift percentages without calculation. Skimmed milk is quite free from fat.

The top 20 ounces are 1½ times as rich in fat as the original milk.
“ “ 15 “ “ 2 “ “ “ “ “
“ “ 11 “ “ 2½ “ “ “ “ “
“ “ 9 “ “ 3 “ “ “ “ “
“ “ 8 “ “ 3½ “ “ “ “ “
“ “ 7 “ “ 4 “ “ “ “ “

The proteids and sugar are about the same in all these modifications.

Chapin also gives the following formulæ:

9 ounces of top milk.	Lowest extreme, 9 ounces of top milk from milk 3 per cent. fat.			Highest extreme, 9 ounces of top milk from milk 5 per cent. fat.		
	Fat, per cent.	Proteids, per cent.	Sugar, per cent.	Fat, per cent.	Proteids, per cent.	Sugar, per cent.
Diluted 8 times[1] . . .	1.10	0.38	0.50	2.00	0.50	0.50
“ 7 “	1.30	0.43	0.57	2.30	0.57	0.57
“ 6 “	1.50	0.50	0.67	2.67	0.67	0.67
“ 5 “	1.80	0.60	0.80	3.20	0.80	0.80
“ 4 “	2.25	0.75	1.00	4.00	1.00	1.00
“ 3 “	3.00	1.00	1.33	5.60	1.33	1.33

16 ounces of top milk.	Lowest extreme, 16 ounces of top milk from milk 3 per cent. fat.			Highest extreme, 16 ounces of top milk from milk 5 per cent. fat.		
	Fat, per cent.	Proteids, per cent.	Sugar, per cent.	Fat, per cent.	Proteids, per cent.	Sugar, per cent.
Diluted 8 times . . .	0.7	0.38	0.50	1.12	0.50	0.50
“ 7 “	0.8	0.43	0.57	1.30	0.57	0.57
“ 6 “	0.9	0.50	0.67	1.50	0.67	0.67
“ 5 “	1.1	0.60	0.80	1.80	0.80	0.80
“ 4 “	1.4	0.75	1.00	2.25	1.00	1.00
“ 3 “	1.8	1.00	1.33	3.00	1.33	1.33
“ 2 “	2.7	1.50	2.00	4.50	2.00	2.00

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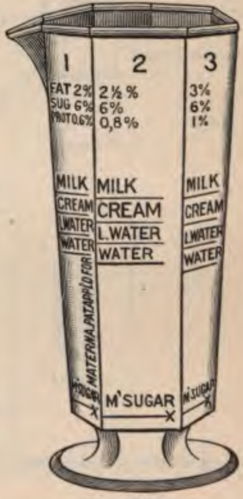
[1] Diluted 8 times means 1 part of top milk, 7 parts of diluent.

In calculating percentages of sugar:

1	part of sugar to	20	parts of mixture, adds	5	per cent.
1	" "	25	" " "	4	"
1	" "	30	" " "	3	"
1	" "	40	" " "	$2\frac{1}{2}$	"
1	" "	50	" " "	2	"

Coit's decimal method will be found complicated by many. He uses a formula based on the metric system, three solutions being required: 1, a decimal (10 per cent.) cream, or superfatted milk, for introducing the fat; 2, a saccharated (10 per cent.) skimmed milk for introducing proteids not contained in the cream; 3, a standard (10 per cent.) sugar solution for introducing the lactose not contained in the cream or skimmed milk. This formula is worked out in the metric system, and must be converted before the mother can employ it; hence its non-adaptability for general use.

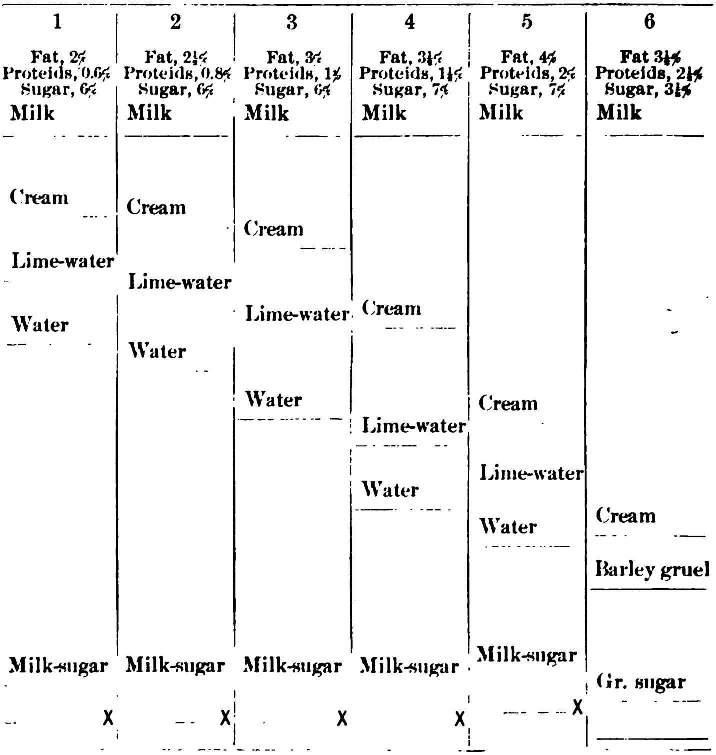
Fig. 10.



Haas' Materna.

The **Materna, a home-modifier of milk,** is a glass graduate with pouring tip, holding 16 ounces. The outer surface is divided into 7 panels, 1 of which shows the ounce graduation; the 6 others show 6 formulæ, so arranged as to be suitable for the entire first year's feeding. By mixing what is called for by two adjacent formulæ, it is possible to obtain other percentages.

Having decided on the formula to be used, the attention is fixed on that panel, the respective ingredients being then poured into the vessel to the line designated for the substance then inserted. First is introduced the milk-sugar, then the water in which this is dissolved, the lime-water, cream, and milk; the whole is thoroughly stirred; the mixture analyzing the same as the formula at the top of the panel. The milk should be clean, average herd milk; the cream 16 per cent. gravity cream; hot water or barley-water made in the usual manner. The vessel is filled once, twice, or three times according to the quantity to be given in twenty-four hours. The whole is then stirred and put into bottles as in other methods of modification. The disadvantage of the Materna is its prescribing a formula for different ages and placing it in the mother's hands, who has no conception of the question of infantile feeding, or the indications for use

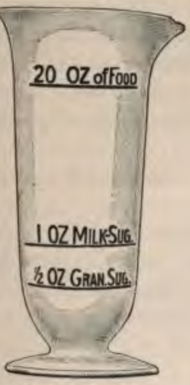


of the various formulæ; but for those unable to understand the other methods if worked out for them, it is a valuable aid.

The Sloane Maternity Milk Set (Cragin's method).—The set consists of a measuring glass holding 20 ounces (see Fig. 11) and a metal dipper (called the Chapin dipper) holding 1 fluidounce (see Fig. 12).

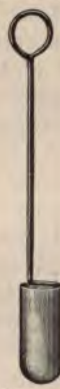
Directions for Use.—Get a quart bottle of good milk and let it stand on ice or in a cool place for a half-hour so that the cream will show at the top of the bottle.

FIG. 11.


20 OZ of FOOD
1 OZ MILK-SUG.
½ OZ GRAN. SUG.

Measuring glass.

FIG. 12.



Dipper.

Sloane Maternity milk set.

From the upper part of the bottle are obtained two kinds of top milk:

Top milk No. I., obtained by taking 10 dipperfuls from the top of the bottle, the first dipper being filled with a spoon to prevent spilling, the remaining 9 dipperfuls being taken by dipping carefully from the bottle. These 10 dipperfuls are to be mixed in a clean pitcher, and from the milk thus mixed the baby's food may be prepared until it is from four to six months old.

Top milk No. II., obtained by taking 16 dipperfuls from the top of the bottle, the first dipper being filled as before with a spoon, the remaining 15 dipperfuls being taken by dipping carefully from the bottle.

These 16 dipperfuls are to be mixed in a clean pitcher and from the milk thus mixed, the baby's food may be prepared from the age of about four months until it is a year old.

In using this milk set, whatever strength of food is desired, the sugar and the lime-water are always the same: 1 ounce of milk-sugar (or ½ ounce of granulated sugar) and 1 ounce (1 dipperful) of lime-water.

The quantity of food made by filling the glass once is always the same—20 ounces. The strength of the food varies with the number of dipperfuls of top milk used.

Preparation of the Food.—First—Into the measuring glass pour milk-sugar up to the line marked 1 ounce milk-sugar, or granulated sugar up to the line marked ½ ounce granulated sugar.

Second.—Add 1 dipperful of lime-water and mix by shaking the glass.

Third.—Add the required number of dipperfuls of top milk according to the age of the baby as explained below.

Fourth.—Fill the measuring glass up to the line marked 20 ounces of food, with water, either plain, or barley-water or oatmeal-water.

During the first month it is usually better to use plain water, after that barley-water, or if the baby is very constipated oatmeal-water.

Strength of the Food for Different Months.—First Day—Give no milk; put in milk-sugar to mark, then fill with boiled water.

Second Day—Add 1 dipperful of top milk No. I.

Third Day—Add 2 dipperfuls of top milk No. I.

Fourth Day—Add 3 dipperfuls of top milk No. I.

Fifth to Tenth Day—Add 4 dipperfuls of top milk No. I.

Tenth to Thirtieth Day—Add 5 dipperfuls of top milk No. I.

One Month to Two Months—Add 6 dipperfuls of top milk No. I.

Two Months to Four Months—Add 7 dipperfuls of top milk No. I.

Four Months to Nine Months—Add 10 dipperfuls of top milk No. II.

When the baby needs more than 20 ounces in the twenty-four hours, fill the measuring glass twice instead of once, before putting the food into the baby's bottle.

After nine months the food is prepared by shaking the quart bottle of milk when first obtained and using the plain mixed milk.

Preservation of the Food.—After preparing the food put it (especially in hot weather) on the stove and heat it till it simmers. It is then ready to be placed in the baby's bottles, which have been thoroughly washed in hot soapsuds and rinsed.

The foregoing directions are given for an average healthy baby. A frail baby or one whose weight is below the average will need to have the strength of food increased more slowly. A very strong healthy baby may have the strength of the food increased more rapidly. If the stronger food does not seem to agree with the baby, decrease the number of dipperfuls of milk used.

By increasing or decreasing the number of dipperfuls of milk, the food may usually be adjusted to the child's digestion.

Amount of Food at Each Feeding for Different Ages.—First Week—½–1½ ounces:

Second and Third Weeks—1½–3 ounces.

Fourth and Fifth Weeks—2½–3½ ounces.

Sixth to Ninth Week—3–4½ ounces.

Third to Fifth Month—4–5½ ounces.

Fifth to Ninth Month—5½–7 ounces.

Ninth to Twelfth Month—7–9 ounces.

For those practitioners who are unable to compute the various ingredients, either from disinclination for such computations or lack of time, there are a number of formulæ suggested by various authors giving the amount of each ingredient and the analysis of the mixture, which may be used for ready reference.

Among these is **Biedert's Cream Mixture**, quoted by Fischer from Jacobi:[1]

	Formula.	Cream.	Water.	Milk-sugar.	Milk.	F.	S.	P.
First month . . .	I.	4 oz.	12 oz.	4½ dr.		2.5	5	0.9
Second month . . .	II.	4 oz.	12 oz.	4½ dr.	2 oz.	2.6	5	1.2
Third and fourth months	III.	4 oz.	12 oz.	4½ dr.	4 oz.	2.7	5	1.4
Fifth and sixth months	IV.	4 oz.	12 oz.	4½ dr.	8 oz.	2.9	5	1.7
Seventh and eighth months	V.	4 oz.	12 oz.	4½ dr.	12 oz.	3.0	5	2.0
Ninth and tenth months	VI.	. . .	8 oz.	3 dr.	24 oz.	2.7	5	2.5

	Cream.	Milk:	Water.	Milk-sugar.		F.	S.	P.
First month	4 oz.	. . .	12 oz.	½ oz.	Equals	2.4	3.8	1.0
Second month . . .	. . .	2 oz.	. . .	. . .	"	2.6	3.8	1.4
Third month . . .	. . .	4 oz.	. . .	. . .	"	2.7	3.8	1.8
Fourth month . .	. . .	8 oz.	. . .	. . .	"	2.9	3.8	2.3
Fifth month	. . .	12 oz.	. . .	. . .	"	3.0	3.7	2.6
Sixth month	. . .	16 oz.	8 oz.	2½ oz.	"	3.0	4.0	3.2

A 6 per cent. sugar solution is used, 5½ drachms of sugar to 12 ounces of water. Biedert claims for the cream mixtures that they are assimilated better than diluted milk mixtures not containing cream.

To make the cream for the mixture, from 1 to 2 quarts of milk are put into a wide-mouth glass jar and allowed to stand on ice for two hours, at the end of which time with a flat spoon from 3½ to 7 ounces of the thin creamy layer are removed. Good results may also be obtained by diluting cream of definite fat-percentage with a sugar solution of known strength.

The **cream** is obtained as follows: A **12 per cent. cream**, by using equal parts of 20 per cent. cream and milk, or 2 parts of gravity (16 per cent.) cream and 1 part of milk; an **8 per cent. cream**, by combining 1 part of 20 per cent. centrifugal cream and 3 parts of plain milk, or 1 part of gravity (16 per cent.) cream and 2 parts of plain milk, or by using the top half of a quart of milk after standing on ice four hours.

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[1] Therapeutics of Infancy and Childhood.

The **sugar solution** is made in **5 per cent. strength** by dissolving 1 ounce of sugar of milk in 20 ounces of water; a **6 per cent.** solution, 1 ounce of sugar in 16½ ounces of water; **7 per cent.** solution, 1 ounce of sugar in 14 ounces of water; **8 per cent.** solution, 1 ounce of milk-sugar in 12½ ounces of water; a **10 per cent.** solution, 2 ounces of sugar in 20 ounces of water.

Formulæ obtained by diluting 12 per cent. cream.—

		Percentage.		
		Fat.	Sugar.	Proteids.
II.	Dilute 5 times with a 6 per cent. sugar solution.	2.0	6	0.60
III.	Dilute 4 “ 6 “ “ “	2.5	6	0.80
IV.	Dilute 3 “ 7 “ “ “	3.0	6	1.00
V.	Dilute 2¼ “ 7 “ “ “	3.5	6	1.20
VI.	Dilute 2 “ 7 “ “ “	4.0	6	1.30

By diluting 5 times, is meant 1 part of cream and 5 parts of sugar solution.

Formulæ obtained by diluting 8 per cent. cream.—

		Percentage.		
		Fat.	Sugar.	Proteids.
VII.	Dilute once with a 10 per cent. sugar solution.	4	7	2.00
XII.	Dilute 1⅓ times with a 7 “ “ “	3	6	1.50
XIII.	Dilute 3 “ 7 “ “ “	2	6	1.00
XIV.	Dilute 7 “ 5 “ “ “	1	5	0.50

Formula obtained by diluting plain milk.—

		Percentage.		
		Fat.	Sugar.	Proteids.
XV.	Dilute once with an 8 per cent. sugar solution.	1.80	6	2.00
XVI.	Dilute 3 times with a 5 “ “ “	0.90	5	1.00
XVII.	Dilute 7 “ 4 “ “ “	0.45	4	0.50
XVIII.	Dilute 11 “ 4 “ “ “	0.30	4	0.34

Nursing-bottles and nipples need very careful attention, failure to observe the strictest hygienic rules being responsible for many digestive disturbances of infants.

Bartley's formula calls for a whey and cream mixture:

From 1 quart of milk after the cream has risen siphon off the under three-fourths (this leaves the top 8 ounces in the bottle). Place in a double boiler the under milk that was removed and add a teaspoonful and a half of good essence of pepsin and warm slowly to blood heat, and keep at that temperature until thoroughly curdled. Now heat with constant stirring until a thermometer dipped into the milk shows a temperature of 155° F. and remove from the fire; strain, while hot, through a clean wire strainer and dissolve in the whey a heaping tablespoonful of sugar of milk and the white of one egg. When cold, pour the sweetened whey back into the milk bottle and mix thoroughly with the cream and top milk. To reduce the caseinogen, draw off more of the bottom milk ; to increase it, draw off less. To decrease the fat, dip off a part of the cream. To increase the fat, add a little less than the full amount of whey after removing the curd. To increase the soluble albumins, add more white of egg. The sugar may be varied at will by adding more or less as desired. The object of heating the whey to 155° F. is to destroy the rennet in the essence of pepsin that causes the milk to coagulate, otherwise the top milk would curdle when mixed with the whey.

The **nipples** should be made of black rubber, and should be boiled for ten minutes after using and kept in an alkaline solution until used again. A nipple should not be used a long time, as the rubber soon cracks and harbors bacteria. There are a number of varieties of nipples, but whichever is chosen, the milk should not run from it faster than in drops: if in a stream when the bottle is inverted, it flows too rapidly, and a child using it will have colic.

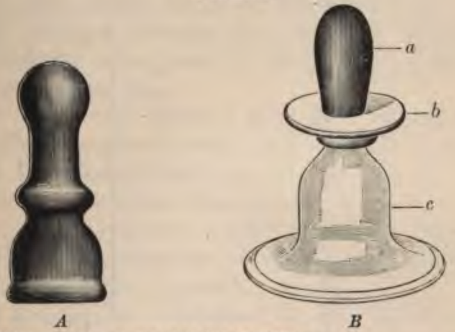
The **nursing-bottle** should be chosen with a view to ease in sterilization ; the neck should be sufficiently large to admit a brush. The so-called **pasteurizing bottles** for use in the Arnold sterilizer, marked with ounces, is a very convenient size and shape, and easily cleansed. The markings on these bottles are frequently inaccurate, however. No milk should be allowed to remain in the bottle after it has been nursed from ; it should be rinsed at once with cold water, then with hot water, and kept filled with water until it is boiled before using the next day.

The **long-tube nursing-bottle** is an abomination, and its sale should be prohibited everywhere by law, as it is in the city of Buffalo. It cannot be kept clean, and is a constant menace because of the number of bacteria the tube contains.

The **nipple** used for the child to suck on between nursings, called the **comforter**, is the cause of much digestive trouble and should never be used.

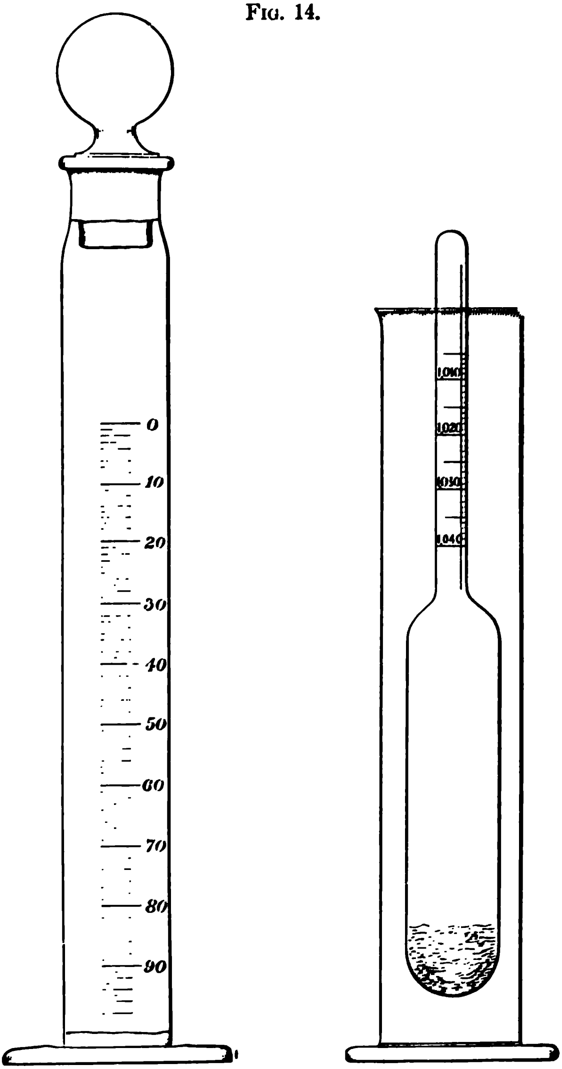
Diluents used in milk modification may be of a number of varieties: barley-water, rice-water, oatmeal-water, or wheat-flour water. These are made in the proportion of two tablespoonfuls of the flour to a quart of water, and boiled for twenty minutes. At the end of this time the solution is thick and jelly-like, becoming more so when cool enough to test by tasting. If at this time is added a diastatic agent, the jelly will quickly liquefy, the solution then being easily strained through cloth. There are a number of these dextrinizing agents, diastase being the chief ingredient. The glycerite of diastase, known as Cereo, is one of the most efficient, but others are made by Parke, Davis & Co., Horlick, Forbes, and others. Dextrinized gruels are valuable as diluents, serving the purpose of attenuating the curds of cows' milk

FIG. 13.



A, black-rubber nipple, reversible for scrubbing.
B, glass breast-shield: *a*, rubber nipple; *b*, bone or ivory guard to prevent child from grasping too much of the nipple; *c*, glass shield, the letter indicates the cone which widens into the flange below.

FIG. 14.



Graduated glass cylinder. **Lactometer.**

Holt's milk set.

making them like those from mother's milk, and also serve a useful purpose as a food for infants with an acute dyspeptic condition or an inflammation of the intestinal tract. Much more dextrinized gruel can be assimilated than gruel without having been so changed. No diastatic agents should be added when the temperature of the gruel is above 140° F.

It is well to consider here the **indications** which may be met with special milk modification as to the percentage of its ingredients, diluents, etc. As a general rule, it may be said a child when first placed on a modified cows' milk should be given a formula with a low proteid percentage, lower than is recommended for this age, and a relatively low percentage of fat. It is much easier to increase the strength of the milk as necessary than to correct some of the pathologic conditions arising from giving a formula too strong at the beginning. There is no set rule which can be adopted as to the strength to be given at various ages.

Too little sugar will cause a slow gain; too much sugar will cause colic, green acid stools, and probably vomiting.

Too much fat causes vomiting; it may also be seen in the stools, appearing somewhat like casein, and may cause frequent stools. The opposite condition will be present if too little fat is given, the existence of constipation being an indication for increasing the proportion of fat.

Excess of proteids is evidenced by colic and the presence of curds in large or small masses in the movements. There may be a relatively poor digestion of proteids which can be only met by a decrease of their percentage. It may be said again, to emphasize the importance of this procedure, that regular weighing of the infant is essential in the management of every case in which artificial feeding is begun.

ARTIFICIAL FOODS.

The other so-called baby foods may be grouped into several classes: 1. The **milk foods,** those to which water only is added, one requiring cooking, the other not, and those in which milk is added, one requiring cooking, the other not.

2. The so-called **Liebig foods, or malted foods.** These are named thus because of the diastatic action of the malt upon the ground cereals, the starch being then converted into dextrin and maltose by submitting it to heat. 3. The **farinaceous or dextrinized foods,** in which a small portion of the starch is converted by cooking into sugar, a large proportion of it remaining unconverted.

In the first group may be mentioned condensed milk, Mellin's Food, and peptogenic milk powder. **Condensed milk** is made by evaporating fresh milk, previously sterilized, to about one-fourth of its volume, after which is added about one-third its weight of cane-sugar for the purpose of preserving it. An examination of the accompanying table[1] will show why this food as ordinarily prepared is not suitable for a regular diet, and why children so fed have rhachitis; irregular bowels, which are easily upset; delayed and troublesome dentition; predisposition to contagious diseases, etc.

	Milkmaid brand.		**Eagle brand.**		**Woman's milk.**
	Diluted 7 times.	Diluted 14 times.	Diluted 7 times.	Diluted 14 times.	
Water	88.18	93.59	89.10	94.09	88.51
Ash	0.36	0.19	0.29	0.16	0.34
Proteids	1.50	0.82	1.31	0.71	2.35
Fat	1.70	0.92	1.18	0.64	2.41
Cane-sugar	6.00	3.25	6.59	3.57	
Milk-sugar	2.26	1.23	1.53	0.83	6.39

It is advised to dilute 14 times for a newborn child and 7 times for an older child, the child never getting more than 1.20 per cent. of fat. To those infants who from necessity are fed with condensed milk, Kerley has advised as giving good results, the administration of codliver oil, until about one year of age, to bring up the amount of fat.

The advantages which may be claimed for condensed milk are that it is sterile, cheap, easy to prepare, useful when travelling and as a temporary food in sickness.

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[1] Fischer, Infant Feeding.

The addition of fresh cream also supplements the amount of fat in the condensed milk mixtures. The following mixtures are feasible (Chapin):

	Proteids.	Fat.	Sugar.	Salts
I. Cream (12 per cent.), 1 part	3.8	12.0	4.2	0.64
Condensed milk, 1 part	8.4	7.0	50.6	1.39
Water, 6 parts				
8)	12.2	19.0	54.2	2.03
Average,	1.5	2.5	6.75	0.25

		Per cent.
II. Cream (16 per cent.), 1 part Condensed milk, 1 part Water, 6 parts	Proteids	1.05
	Fat	3.00
	Sugar	6.75
	Salts	0.25
III. Cream (16 per cent.), 1 part Condensed milk, 1 part Water, 10 parts	Proteids	1.00
	Fat	2.00
	Sugar	4.50
	Salts	0.16

Mellin's Food is used with cows' milk to modify it, the analyses of the formulæ suggested by the makers being very much like those of mother's milk, the proteids being vegetable and not animal. It acts as an attenuant to the curds of cows' milk.

Peptogenic milk powder is used with milk and submitted to heat, this process changing the composition of cows' milk so as to render the proteids more soluble, they being converted into partial peptones.

In the second group, the **malted foods** are Nestle's Food, malted milk, and milkine.

Nestle's Food, when prepared as directed, analyzes the fat about one-sixth of that in mother's milk, and the proteids about one-third, the major portion of these being insoluble.

Malted milk is used without the addition of fresh cows' milk, the proteids, fat, and carbohydrates being less than in mother's milk; the proteids are one-half and the fat one-third of the amounts in woman's milk.

Milkine is a dried milk food with which beef-extract is combined. This milk contains much less fat and proteids than mother's milk.

In the third class, the **farinaceous** or **dextrinized** food is **Imperial Granum**, with which is used milk, both fat and carbohydrates being insoluble starch.

There are many other foods on the market, but lack of space prevents their mention.

Fischer has done much to popularize **Professor Gartner's Mother-milk**, which is prepared by putting milk through a separator revolving 4000 to 5000 revolutions per minute, separating the milk into a creamy milk and skimmed milk, each running off through separate tubes.

In **peptonized milk** the proteids have been digested, converted into peptones, which can be accomplished either partially or completely. When completely peptonized, the taste is decidedly bitter; when partially, the taste is not so objectionable.

Peptonizing tubes containing 5 grains of pancreatine and 15 grains of sodium bicarbonate are added to 1 pint of fresh milk and 4 ounces of water. This is then heated to 105° or 115° F. and the digestion stopped by placing the vessel on ice or rapidly bringing it to a boil. For completely peptonizing, the milk is boiled for two hours. In cases of temporary digestive disturbance in a child fed on modified milk it is best to peptonize the milk after modification, always adding the dextrinized gruel, if this is used as a diluent, **after** the peptonizing process. Peptonized milk is always used in **nutritive enemata**, as the rectum is an absorbing organ and not a digestive one. It should never be given over a great length of time by the stomach, as this organ will gradually become unable to perform its function if long relieved of its work.

Junket or curds and whey is made by coagulating the casein of cows' milk by the addition of essence of pepsin (Fairchild's) in the proportion of one teaspoonful to the pint of milk at about 115° F. This is gently stirred sufficiently to mix thoroughly and set aside to cool, when it will curdle firmly and can be served with or without sugar.

Whey is made in the same way, except that as soon as the milk curdles it is broken up with a fork until finely divided, and strained through a cloth.

Wine whey is made by the addition of an ounce of sherry wine to a pint of the whey.

Albumin-water, or **egg-water,** is made by adding the white of one egg to one pint of cold water, stirring sufficiently to mix thoroughly, but not beating it.

Authorities differ as to the permissibility of this food in acute dyspeptic conditions, those not advocating it claiming that it is an excellent culture-medium for bacteria, a thing to be avoided under all circumstances.

Beef-juice is a valuable food, and is made by heating through a piece of lean beef, cutting into small cubes, and squeezing through a meat-press or lemon-squeezer into a warmed vessel. About 4 ounces of beef-juice may be obtained from 1 pound of steak. This is seasoned by the addition of salt, and fed undiluted or in barley-water, about an ounce at a feeding, three or four times a day.

Broths (**beef, veal, mutton,** or **chicken**) are made by boiling a pound of the meat in a pint of water for about two hours, adding water occasionally to keep the quantity up to one pint. An ounce of barley may be added to the broth when the cooking is begun. It is seasoned to taste with salt. In making chicken broth a lean chicken is chopped fine, bones and all, before it is put on to boil, and all the meats should preferably be allowed to soak for a while before boiling. Broths should be carefully skimmed of any fat remaining after they have cooled. These broths are not very nutritious for a long period, containing but little fat, and about 1 per cent. of proteids and nearly 2 per cent. of extractives. They may have a very decided laxative effect in diarrheal affections when given as a substitute for milk.

Arrowroot is made from the Bermuda arrowroot—1 teaspoonful to 4 teaspoonfuls of cold milk. After mixing, this is poured slowly into a half pint of boiling milk and allowed to simmer, stirring constantly to prevent lumps forming. It is seasoned with salt or sugar. The objection to this is that the milk must be boiled, a procedure which always retards its digestibility, even in health.

An **arrowroot-water** may be made by adding 1 teaspoonful of arrowroot to 1 pint of water, allowing it to cook slowly for twenty minutes, stirring constantly, and should be fed warm or cool.

Scraped beef is a valuable food, and ordinarily easily digested by the infant. Raw or very rarely done beef is scraped with a dull knife, the meat pulp being fed to the child, about a tablespoonful at a feeding. It is first heated through in the form of a cake on a hot griddle.

Koumyss is a fermented milk, and is taken well by some children, but objected to by the majority. Holt recommends the following formula for its home manufacture: 1 quart of fresh milk, ½ ounce of sugar, 2 ounces of water, a piece of fresh yeast-cake half an inch square, put into wired bottles, keep at a temperature between 60° and 75° F. for one week, shaking five or six times a day, and then put upon ice. It contains alcohol, carbon dioxide, and lactic acid, and because of these products and the changes in the casein it is frequently retained when the stomach rejects all else. For infants it should be diluted with equal parts of water, given in small quantities, and served cold.

QUESTIONS.

What is characteristic of mother's milk during the first few days?
What counterindications exist to nursing?
Describe pasteurization; sterilization.
What are the analyses of cows' milk and human milk?
How is cream obtained?
What is milk modification? How may it be accomplished?
What are milk laboratories?
What is Baner's method? Chapin's? The Materna? Biedert's cream mixture? Cragin's method?
How should nursing-bottles and nipples be cared for?
What special symptoms may be met by milk modification?
How are the various artificial foods classified? Give examples of each. Name them.

CHAPTER VII.

FEEDING OF OLDER CHILDREN.

FEEDING DURING THE SECOND YEAR.

THE larger portion of the infant's diet during the second year should consist of unmodified cows' milk, supplemented by some of the cereals, egg, fruit, and some animal food. Too early feeding of children of this age with general table diet is responsible for the reputation the **second summer** of a child has. There is no reason why teething should cause any serious trouble, yet this phenomenon is held responsible in the majority of cases of digestive disturbance during the second summer. A healthy child should be able to take unmodified cows' milk during the eleventh or twelfth month, gradually increasing the strength of the modified milk from that time until it is given whole. If the child is unable to digest starch at all, the carbohydrate must be supplied by giving milk-sugar. The cereal may be given in the form of a gruel mixed with the milk. A child should be taught to give up its bottle before or at least by the time it is a year old, thus diminishing the chance of infection by means of the nipples and bottles; it may be fed at first by a spoon and soon taught to drink from a cup.

The child should have five meals a day, at 7 and 10 A. M.; 1, 4, and 7 P. M.; and only given water at night if it wakens and asks for milk. From twelve to fourteen months of age, bread and cows' milk, cereal once a day, a broth (chicken, beef, or mutton) with some bread crumbs, for one feeding, the others being milk. Plenty of water is given between meals. *Well-cooked* rice may be given at about fifteen months, but this should be thoroughly boiled first. As a rule the cereals are not cooked sufficiently long. The child may be given toast, zwieback, or a beaten biscuit to nibble on during this period and an egg may be given for one feeding. At eighteen months, when it has most of its teeth, it may have scraped beef, a baked potato, baked apple, or stewed prunes. Fruit should be given during this period—orange-juice begun as early as the twelfth month, care being taken not to give any of the pulp, and prunes a little later.

Gavage, or **forced feeding,** is a valuable agent in certain cases in which the child will not eat or is too weak to do so. If under a year, a weak modified milk is advised, making it stronger as the child improves.

A child given a varied diet within the above limits will generally thrive, but when fed for a long time exclusively on one article, as condensed milk, it will be unable to digest cows' milk, or to pass at once from prepared or dried foods to a mixture of cows' milk.

The diet of children during the third and fourth years should be carefully supervised. Four meals a day should be given, at 7 and 10.30 A. M., 1.30 and 6 P. M., but nothing between meals. The following is a sample **menu** for twenty-four hours: 7 A. M., **breakfast,** orange, cereal with cream and sugar, glass of milk. 10.30 A. M., **lunch,** milk, cup of broth, toast or zwieback, beaten biscuit or cracker. 1.30 P. M., **dinner,** finely minced or scraped beef; potato or baked apple, or spinach finely divided; prunes; rice or bread pudding. 6 P. M., **supper,** bread and milk.

A child should early be taught to eat slowly, and thoroughly masticate its food, and until its fifth year should not be fed at the table with adults. Indigestible articles, sweets, and cake, should not be administered at any time, and no eating allowed between meals.

QUESTIONS.

What should be the basis of a two-year-old child's diet?
What part does teething play in digestive disturbances?
How should cereals be prepared?
What is gavage?

CHAPTER VIII.

NUTRITIONAL DISORDERS.

ATHREPSIA.

Synonyms.—Marasmus; Malnutrition; Inanition; Wasting disease.

Definition.—Athrepsia is a condition following generally after acute or chronic digestive disorders.

It **develops in** children of weak and delicate parents; in the premature who have never been able thoroughly to assimilate food; and in those exposed to unhygienic surroundings and who are seldom in the fresh air.

Symptoms.—Among the earliest is loss of weight or failure to gain extending over several months. The infant is shorter than other infants of the same age; has flabby muscles; delayed dentition; restlessness; irritability of the abdomen; irregular movements from the bowels, constipation alternating with diarrhea; susceptibility to contagious diseases, and little resistance to them; subnormal temperature; stomatitis; and coated tongue.

Diagnosis of athrepsia from the less serious forms of malnutrition is often difficult, the border-line not being easy to distinguish. **Tuberculosis** shows fever, probably with signs in the chest—**lymphadenitis** is present in both. In **congenital syphilis** the child has snuffles and a dry skin with characteristic eruptions. In **chronic digestive disorders** the history is of assistance in making the diagnosis.

Prognosis is invariably grave in the severer forms of athrepsia, and in those cases in which heredity bears a causal relation.

Treatment.—Principal indication is diet—a serious problem —and a change in the surroundings. If in breast-fed children, modified milk or a wet-nurse, if that be possible, should be substituted at once. If diarrhea is active, milk should be used sparingly, peptonized if at all; and if modified milk, the formula should not be stronger than that for a month-old baby. Regular bathing followed by a cool sponge; inunctions of codliver oil, also given internally if there is absorption; plenty of fresh air; regularity of habits, as to feeding and sleep especially; careful attention to clothing, as it is essential to maintain the body heat. In older children, iron, arsenic, and codliver oil are the best assimilated tonics.

SCORBUTUS.

Synonym.—**Scurvy.**

Definition.—A constitutional disease due to prolonged error in diet.

Etiology.—Scorbutus is a typical disease of infancy occurring usually before the end of the second year. The diet is the chief causative factor, generally due to prolonged feeding upon one of the proprietary foods or condensed milk, or, according to some authors, on sterilized cows' milk. It is found often in private practice, among the well-to-do as well as among the poorer classes. The continued use of any food which lacks the vital quality of freshness necessary to nutrition will cause it.

Pathology.—The chief changes are in the bloodvessels and in the blood, which permit the escape of blood through them or an escape of diseased or changed blood through normal vessels. Subperiosteal hemorrhages are the principal feature, the long bones of the lower extremities being affected much oftener than those of the upper; the ribs are also affected, and hemorrhages occur subcutaneously and in the deeper muscular structures.

Symptoms.—The onset is usually sudden, the infant showing perhaps for a week or so some signs of anemia; on handling, the child will give evidences of tenderness and pain; will not walk; pain may be present when quiet; an apparent or pseudoparalysis may be present; swellings of the limbs may be found on the shaft or near the epiphysis, due to subperiosteal hemorrhages; the pallor of the skin is intensified by the bruise-like hemorrhages over the body, and occasionally petechial spots; if the teeth have been cut, characteristic spongy, swollen, and bleeding gums will be found, but no change in the gums if no teeth are present, the change being generally more marked in the upper gum; **melena** may be present; blood in the urine is not uncommon, with albumin due to this constituent; an exophthalmos may be present from hemorrhage behind the globe; the temperature is rarely high. Cases of all grades of severity are seen, some presenting few symptoms except the tender joints, and some presenting all the above symptoms.

Diagnosis is principally from **rheumatism** and **paralysis**; but if scurvy is kept in mind, the diagnosis will generally be easy.

Prognosis is universally good if the disease is recognized early and proper treatment at once instituted. Recovery may be expected in a month's time.

Treatment is essentially one of diet. Change the diet at once; stop proprietary foods, condensed and sterilized milk, or peptonized milk. Give raw cows' milk, orange juice, mashed potato, and freshly expressed meat-juice; fresh undiluted cows' milk will meet the required needs without any medication. As these children necessarily have a weak proteid digestion, dependence must also be placed on vegetables and the fruit juices. Improvement will be noted in a few days. Because of the pain the child should be kept quiet and the movements of his limbs restricted. The crib should be placed in the sunlight, and the child allowed plenty of fresh air.

RHACHITIS.

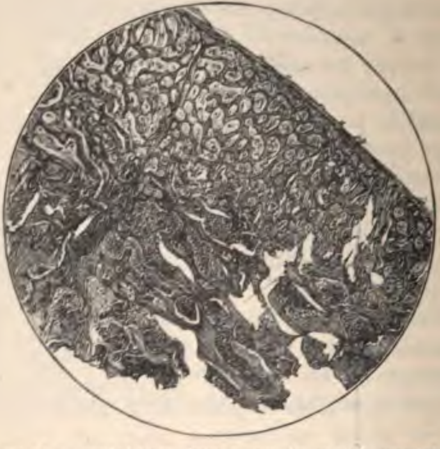
Synonym.—Rickets.

Definition.—A constitutional disease evidencing itself by changes in the bones principally, but all of the organs undergo to a certain extent the nutritional disorder.

Etiology is principally to be looked for in the diet, though faulty hygienic conditions are the principal contributing causes. Rhachitic children are generally artificially fed or breast-fed children whose nursing has been prolonged into the second year. There may be a previous history of failing health following the exanthemata, protracted diarrheal affections, pneumonia, or bronchitis. The food, such as condensed milk and certain of the farinaceous foods containing unconverted starch, which is responsible for the changes, is deficient especially in fat and proteids.

Pathology.—As above stated, all the tissues of the body share in the changes, but the principal ones are in the bones. The long bones show the changes chiefly at the ossification-centres, which are located at the area of cartilage between the epiphysis and the shaft. The bone grows in length from these points, and in rickets there is an exaggerated production of cartilage here, the increase in diameter being greater than the increase in length; hence one of the first signs of rickets is an **enlargement of the epiphyses.** This same process occurs in the ossification-centres of the cranial bones, especially the parietal. Hence are found enlarged epiphyses of the long bones; "beading" of the ribs; prominences on the flat bones of the skull, especially the parietal. Another change is the

Fig. 15.



Section of a part of a cranial boss, from a case in which craniotabes was also present. (Photomicrograph by Mr. F. Fowke.)

softening of the bones, due to a lack of ossification and a disproportion between the organic and inorganic matter. This softening causes an undue **flexibility**, with resulting characteristic **rhachitic** deformities.

The **microscopic changes** show a marked increase in the new cartilage-cells and an increased vascularity of the periosteum and the proliferating zone. In some places the cartilage-cells are changed to bone, but are mostly spongy in character. Coincident with improvement following treatment, cell proliferation ceases and calcification with normal bone-tissue begins, the enlargements due to the hyperplasia are absorbed, and the bone is normal save for the deformities resulting from the previous elasticity of the bone.

Focal Symptoms.—A well-marked case of rhachitis is easy of recognition, but an incipient case frequently is undiagnosed. The picture presented by a typical case is as follows: The head is large, with wide bitemporal diameter and enlarged parietal and frontal **bosses**; the forehead is high and prominent; the anterior fontanelle is large, with frequently an open coronal suture. In the occipital bone are found two soft areas, which may be pressed in by the fingers, but spring out when pressure is relieved. These are called **craniotabes**, and are also found in infantile syphilis, but less frequently. The veins of the scalp are large.

The **long bones** show **symmetric swellings** at the epiphyses, especially marked at the wrists. If the child has walked, the weight of the superimposed body on the legs causes a bending of the femur, tibia, and fibula into bowlegs, **genu varum**; or an anterior curve of the tibia and fibula; or there may be knock-knees, or **genu valgum.** The arms and forearms may be bent also.

The **ribs** show characteristic changes; at the epiphyseal ends are enlargements called the **rhachitic rosary**, and because of the softness of the bones the atmospheric pressure causes a depression at this point and a prominence of the sternum, so-called **pigeon breast.**

The **spine** is often curved, due to softening of the vertebræ, causing an anterior or a posterior curvature, a **kyphosis** or a

lordosis, less frequently a lateral curvature (**scoliosis**). Early in the disease these curvatures disappear when the child is suspended or lies down.

The **teeth** appear late, but if present early are apt to decay. Irregular dentition is the rule, and troublesome symptoms are present in most cases.

The changes which take place in the **pelvis** of female infants as the result of rickets are of special importance. Because of the weight of the vertebral column on the softened sacrum this bone is pressed forward, causing the **flat rhachitic pelvis** so important to the patient from an obstetric standpoint. The softened and weakened muscles and the softened ligaments tend to increase the deformity. Walking is learned late.

Systemic Symptoms.—**Anemia** is well pronounced. The distended **abdomen,** commonly called pot-belly, is mainly due to the chronic indigestion present and the accumulation of gases, also to the diminished action of the musculature of the intestines.

Head-sweating is an early phenomenon and one of the most constant symptoms. This occurs chiefly while the child is asleep, the pillow being thoroughly wet when it awakens. **Laryngismus stridulus often occurs**; or tetany; frequently general convulsions. **Spasmus nutans** may occur. **Restlessness** at night is one of the most frequent of the early symptoms. Constipation is frequent.

Prognosis and Course.—Rhachitis is essentially a chronic affection, and recovery may always be expected if the child can be put on proper diet, but improvement is slow. The deformities do not disappear, but the enlargements of bone are gradually absorbed. Though seldom fatal in itself, many children so affected die because of their lessened resistance they are very susceptible to infantile diseases of a serious nature.

Diagnosis.—It is only during the earliest manifestations that the diagnosis is not clear. The earliest symptoms—sweating of the head, craniotabes, enlargement of the epiphyses, restlessness at night, patent foramen ovale, rhachitic rosary, and beginning deformity of chest—are not readily overlooked or mistaken for anything else. **Hydrocephalus** is generally easily differentially diagnosed.

Prophylaxis consists of regulation of the child's diet and the adoption of hygienic measures.

Treatment.—Remove the cause, improve unhygienic surroundings, and supervise the diet. Plenty of outdoor air and sunshine; cool baths followed by friction to promote activity of the skin, and because of the susceptibility of these children to catarrhal affections to accustom them to surface-changes of temperature. A country life is best if this is possible.

The **diet** should be seen to personally by the physician. Stop proprietary foods, and reduce carbohydrates to a minimum. Cream, beef-juice, and scraped beef add materially to the progress if they may be given early. Codliver oil is a remedy which may be looked on as a food as well as a medicine, and should be given as long as it is tolerated by the stomach, withdrawing it temporarily if it is found to derange the digestion. Lime is a good tonic agent, but not a specific, and may be given in the form of the hypophosphite. **Atropine,** $\frac{1}{800}$ grain three or four times a day to a child of six months, is of value for the excessive head-sweats.

The opinion of the profession in regard to the use of phosphorus is much divided, a large proportion believing it is of no service in rickets. It may be given as the official oil of phosphorus, diluted with olive oil, or as Thompson's solution.

Deformities of the spine are best treated by posture, lying upon a hard bed without a pillow, not allowing the patient to rise at all, and later by gymnastics and judicious use of apparatus.

Deformities of the long bones are outgrown in mild cases; but little may be expected from the use of orthopedic apparatus, an osteotomy being usually necessary to straighten them.

SPASMUS NUTANS.

Because of the close relationship of this trouble and rhachitis it is referred to at this place. It is **evidenced by a** characteristic and uncontrollable head-shake, usually nodding, sometimes rotatory, and least frequently both motions combined.

Etiology.—Spasmus nutans may follow a trauma, but generally there is a history of rickets. Heredity is not always to be traced, or it may begin after nystagmus has existed for some time. Fright is often a factor.

Symptoms.—There is a persistent uncontrollable head-nodding, the movement being rotary in some cases, and in others only the nodding. There is generally associated a nystagmus, which is an involuntary movement of the eyes, rhythmical and oscillatory, either vertical or horizontal. The head-nodding is most active when the nystagmus is most noticeable.

Prognosis is good in most cases.

Treatment.—Remove any causative factor which may exist in the diet or domestic surroundings, and put the patient under antirhachitic treatment; give sedatives in the form of bromides and tonics if indicated. Some cases recover without treatment.

QUESTIONS.

Define athrepsia. Give synonyms. What are its symptoms?

Name diagnostic points between athrepsia and tuberculosis; congenital syphilis; chronic digestive disorders.

What is the prognosis?

What are the chief indications for treatment? How should diet be regulated?

What is scurvy? How caused?

What general pathologic changes occur? What are the changes in the bones and muscles?

What are the symptoms?

How diagnosed from rheumatism? From paralysis?

What is the prognosis, and how is it influenced?

What is the treatment?

What is spasmus nutans?

What is the cause?

Describe the treatment.

Define rhachitis.

What are the principal causes?

What tissues undergo principal pathologic change? What changes take place in bone?

What are symptoms in incipiency?

What systemic symptoms are present?

How is its course influenced?

What are some diagnostic points?

Describe the dietetic, hygienic, and medicinal treatment.

Describe spasmus nutans.

CHAPTER IX.

DISEASES OF THE NEWBORN.

ICTERUS.

Synonym.—Jaundice.

THE **cause** of this symptom, which occurs from the second to the fifth day after birth, is unknown, though a number of causes have been suggested. It is present in about one-third of all infants, mild in the majority of these, and is probably due to resorption of bile, being hepatogenous in its origin, the change from the fetal circulation being largely responsible; the blood-cells degenerate and bile-pigment is readily formed. If due to malformation of the bile-ducts, the prognosis is grave. In some cases the real pathologic condition and the cause are shown by autopsy. In a case of the writer's, in which the jaundice was intense, the postmortem investigation revealed a hemorrhage into the right kidney which pressed upon the liver and its ducts.

Symptoms.—The principal symptom is the yellow discoloration of the skin, the conjunctivæ, and the excretions. The child is apathetic and dull, and nurses sluggishly. The discoloration usually increases in severity after one or two days, then gradually fades, disappearing in about a week. Physiologic jaundice requires no treatment except a small dose of castor oil or calomel.

SEPSIS.

This is a **not uncommon** condition in newborn infants.

Etiology.—Sepsis is directly the result of an infection by pus-producing or infecting organisms which may gain entrance by way of the **umbilical cord** or its **stump**; **accidental injuries** from operations with unclean instruments or infection later at point of abrasion; abrasion of the **buccal mucous membrane**; operation for **tongue-tie or circumcision**; **septicemia** of **mother** during gestation; **putrefaction of liquor amnii** and aspiration of this by child, causing a septic pneumonia; violent **vaginitis of**

mother acquired during last weeks of **pregnancy**; **transmission** of **streptococci** by **milk** in mastitis and from the **gastro-intestinal** tract.

Systemic Symptoms.—Temperature is high, fluctuating, with morning remissions; the child refuses to nurse, cries continually, lies with legs drawn up; abdomen is distended; pulse rapid; convulsions may occur; skin is hot and dry and may become discolored by effused blood just before death.

Focal symptoms are those of infection regularly seen at the site of entrance.

Prognosis is grave.

Treatment.—If the site of infection can be located early and cauterization accomplished, there may be some hope of arresting the course of the process. Stimulation and feeding offer the only hope of success.

OPHTHALMIA.

Definition.—This is a **conjunctivitis** due to an infective organism, generally introduced into the conjunctival sac in the passage of the child's head through the vagina and cervix. If severe, it is called **ophthalmia neonatorum.**

The **infecting organism** in the majority of cases is the gonococcus, though the colon bacillus and the commoner pyogenic organisms may be the cause.

Focal Symptoms.—These vary according to the severity of the pathologic process. The first noted is a slight matting together of the lids, swelling and redness of the conjunctivæ, copious purulent discharge, with ulcerations and swelling of the cornea in severe cases. Photophobia is usually present.

The **systemic symptoms** are only restlessness and irritability ine svere cases.

Prophylaxis consists in the regular use of the original modified Credé method of prevention, the instillation into both eyes of 1 drop of a 1 or 2 per cent. solution of silver nitrate, respectively, immediately after birth. This should be a routine practice in institutions and in every private case that gives a history of leucorrhea prior to labor. In all other cases the eyes should be thoroughly cleansed with a saturated solution of boric acid.

Prognosis.—Gonorrheal ophthalmia is always dangerous to the integrity of the cornea and requires persistent, faithful treatment to avoid serious damage. The other forms of the disease are less serious, but likewise demand conscientious attention.

Treatment.—A consultation with an oculist should early be had. Frequent and thorough irrigation with normal saline solution; in the interim the application of ice-cold cloths, which are destroyed as removed and replaced by fresh ones removed from a block of ice; the judicious application of silver nitrate to the lid conjunctivæ by swab or by drops. *Protection of the unaffected eye should be carefully observed by application of a watch-crystal by adhesive strips, and tying the child's hands.*

ATELECTASIS.

Definition.—Atelectasis is a condition in which the lungs continue collapsed after birth, remaining as in the fetal state.

Etiology.—There has generally been a previous asphyxia, or a plug of mucus has been aspirated into a bronchus permanently closing it. Premature and feeble children are apt to be sufferers from this condition.

Pathology.—The lung shows depressed areas over the surface which are dark in color and do not crepitate on pressure. They may be scattered over the surfaces or be principally over the bases posteriorly. If a section of the atelectatic lung is excised, it will sink in water; the distended portion will float. Emphysematous areas surround the collapsed portion.

Symptoms.—The child, if the area involved is extensive, will be cyanosed all of the time. If it does not die during the first few days, it does not thrive, has a feeble cry, becoming more cyanosed when crying, and convulsions may occur. Indigestion frequently occurs, and from rapid formation of gas may embarrass respiration also.

Physical signs are of little assistance in arriving at a diagnosis; there is little change in the percussion-note because of the emphysematous areas around; no bronchial breathing, only feeble and slightly harsher than normal.

Treatment.—The principal indication is to make the child breathe deeply and cry soon after birth; and if a child will not cry it should be made to do so by spanking, hot and cold water applications or bath, and rubbing the spinal column, artificial respiration, swinging in the inverted position, and any other means to cause respiration to begin.

HEMORRHAGE IN THE NEWBORN IN GENERAL.

Causes.—A newborn child is especially prone to hemorrhages; the blood is much changed in character at this time owing to the change in the circulation, and the bloodvessels are easily ruptured—both acting as causative factors. These hemorrhages may be the result of an injury received at the time of delivery or due to a weakness of the bloodvessel wall itself.

CEPHALEMATOMA.

Definition.—A cephalematoma is a blood tumor which occurs upon the skull—beneath the pericranium—from a ruptured vessel in this membrane. It occurs some hours or two or three days after birth.

It may not be due to a traumatism during labor, as the writer has seen a double one occurring in a child born in breech presentation after an easy labor. Cephalematomata may be double, always are located over a bone, and limited to that bone because the pericranium is attached at its edges. Cephalematoma is generally located over a parietal.

Symptoms.—The tumor reaches its maximum size in about a week after its appearance and disappears only after several weeks. There is frequently only a small ridge left at the outer edge of the tumor which is not absorbed for some time afterward.

Treatment.—The tumor should be left alone, care being exercised to prevent pressure on the same which occurs when the child lies on the affected side. It should not be aspirated.

Cephalematoma is to be **distinguished from a caput succedaneum**, the extravasation in the latter condition being serum, and in the cellular tissue, between the skin and the pericranium. The caput is found upon the presenting part at birth and disappears in a few hours after birth. An **encephalocele** occurs along the line of the sutures and in the fontanelle, and is reducible, pressure causing cerebral symptoms.

CEREBRAL HEMORRHAGES.

Cerebral hemorrhages **occur** frequently as an accompaniment of birth, arising from rupture of the vessels of the pia mater, and because of the symptoms the term is used interchangeably with **cerebral paralysis**. They are frequently a cause of death in the newborn. They occur in breech as well as vertex presentation, in normal as well as instrumental labors, the site of the hemorrhage being more frequently at the base.

Symptoms.—If large, the hemorrhage may cause death of the child before birth; and if small, it may cause convulsions, opisthotonos, rigidity, asphyxia, irregular respiration, and slow pulse. The pupils are variable and there may be nystagmus. If the cases are not fatal during the first four days, they may survive with varying symptoms according to the location of the hemorrhage and its extent: hemiplegia, diplegia, epilepsy, spastic paraplegia.

Treatment.—The treatment is mainly preventive by terminating long and tedious labors by the judicious use of forceps; the after-treatment is largely symptomatic.

UMBILICAL HEMORRHAGE.

Causes.—Umbilical hemorrhage **may occur** through the cord before it drops off. It may be easily arrested, but shows a tendency to recur, these children being of the class called "**bleeders.**" If the hemorrhage occurs from one point, the application of a styptic is frequently sufficient, but it may be necessary to insert needles through the skin about the umbilicus at right angles and a figure-of-8 **suture** passed over these.

After the cord separates there is frequently a **granulating area** from which there is a discharge, mucopurulent in character, or the stumps of the vessels may remain projecting above the surface of the navel. The skin of the umbilicus is encrusted as a rule with dried mucopus from the granulations. Hemorrhage may occur from the granulatious or very infrequently from the vessel-stumps.

Treatment.—After thorough cleansing, the red granulating area should be touched with a 40 grain to the ounce solution of silver nitrate and dressed with gauze saturated with balsam of Peru and castor oil.

MELÆNA NEONATORUM.

Definition.—A hemorrhage from the stomach and intestine, occurring during the first few days of life. The blood vomited may be bright red or in dark masses; that from the intestine is always dark.

Etiology is obscure, a condition of hemophilia, a gastric ulcer, changes in the vessel-walls and in the character of the blood itself.

Symptoms.—During the first two or three days of life the child vomits blood and passes bloody stools, either fluid or lumpy. It must be borne in mind that blood may be vomited which is drawn from a fissured nipple with the milk. The vomiting of blood is frequently excited by nursing. Hemorrhage from other organs—vagina, bladder, mouth, or nose—is occasionally present.

Prognosis is always unfavorable in the hemorrhagic diseases, but complete recovery may take place.

Treatment by medicines is of little avail; ergot has been recommended. Saline infusion should be tried if hemorrhage is profuse.

UMBILICAL HERNIA.

Causes.—Umbilical hernia, which is a protrusion of the bowel through the opening for the passage of the umbilical vessels, may develop within a few days after the cord drops off. This is more likely to be found in babies that cry a great deal from colic, hunger, etc., or who strain through constipation and coughing. It varies in size from a small projection to a large tumor which may become strangulated.

Treatment.—The hernia is reduced—held in place—by a convex surface over which is placed a strip of adhesive plaster. The pad may be made of a button-mould or a number of thicknesses of the plaster. When the pad is changed, the bowel should not be allowed to protrude, as this opens the ring again and separates the previous adhesions of its walls. Strangulated umbilical hernia calls for immediate surgical interference.

TETANUS.

Synonyms.—Trismus nascentium; Lockjaw.

Definition.—Tetanus is a condition characterized by tonic and clonic convulsions affecting the muscles of the jaw and finally of the whole body. It is due to a specific germ, introduced into the child's circulation, generally through the umbilicus, though it may find entrance elsewhere.

Symptoms.—The first symptoms are noticed about the time the cord separates, from the fourth to the seventh day. The child shows a disinclination to nurse and finally an inability to do so: it is restless and cries continually; the convulsive stage soon begins, the spasms are general, and brought on easily by any external irritant; there are stertor and cyanosis, perhaps unconsciousness; the patient may, however, lapse into consciousness between the convulsions. The temperature runs usually from 101° to 106° F.; respiration very hurried, perhaps irregular.

Treatment.—The only hope lies in the employment of **tetanus antitoxin.** The mortality under any other form of treatment is practically 100 per cent. In addition to the antitoxin it may be wise to keep the patient under bromide and chloral. Feeding may have to be accomplished by gavage—as the mere act of nursing is sufficient to precipitate a convulsion.

Prophylaxis is the best treatment, consisting in surgical cleanliness in the care of the umbilicus and the employment of antiseptic dressings. Balsam of Peru and castor oil make an excellent dressing (Gallant):

℞ Balsami Peruviani, ♏xx;
Olei ricini ℥j.
M. et S.—Apply on gauze to the stump of the cord.

MASTITIS.

Causes.—Mastitis may appear in the newborn. In a large percentage of newborn infants during the first two weeks the breasts fill with milk—occurring with equal frequency in both sexes. If disturbed, these accumulations may result in an inflammation, but rarely does this occur unless some manipulation looking to evacuation of the milk has been attempted, associated with lack of cleanliness.

Symptoms are pain, tenderness, swelling of the breast, crying when handled, loss of appetite, and disinclination to nurse.

Termination is generally in complete resolution with absorption of the milk; but an abscess may form requiring incision, which in the female may impair the future function of the breast.

SCLEREMA.

Definition.—Sclerema is a hardening of the skin as a whole or in small areas, occurring in athreptic infants usually with fatal termination. It may occur at any time during the first few weeks, though it is more often encountered early.

Symptoms.—The first signs are usually found on the calves of the legs or dorsum of the feet, extending upward over thighs and abdomen and on the cheeks. The surface is dry and cold, and has generally a yellowish tinge; the temperature is subnormal; pulse weak; voice feeble; death occurs without a struggle; if recovery takes place, it is very gradual, the edema disappearing first in the face; the appetite returns and the circulation improves, the redness and wrinkling of the skin remaining for some time.

Etiology is obscure, general feebleness being the chief factor, occurring as it does generally in premature and poorly nourished children.

Pathology.—The chief changes are in the skin and connective tissue; but few microscopic changes have been noted. Atelectasis and bronchopneumonia may be present.

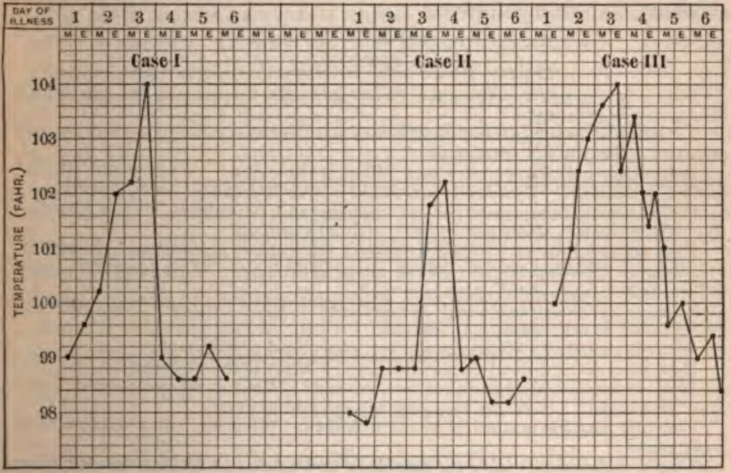
Prognosis is grave.

Treatment consists in maintaining warmth by an incubator, suitable nourishment, and stimulation.

STARVATION TEMPERATURE.

Causes.—During the first week of life a child frequently develops a temperature which is more or less continuous until there is an abundant supply of milk, when it falls to normal, the same occurrence being noted when the child is artificially fed and given water freely.

Fig. 16.



Starvation temperature.

Symptoms.—A child which develops a **starvation temperature** will show a decided loss in weight during the first few days; it will be restless and cry a great deal, will suck vigorously at its fist and at the breast, from which there seems to be no flow of milk; its temperature will range from 101° to 105° F.; the skin is hot and dry, mouth and tongue dry, with gradually supervening prostration and weakness. These symptoms gradually disappear, the first to show improvement being the temperature, which generally reaches normal after two or three nursings or artificial feedings of a properly modified milk.

Prognosis and Treatment.—If the child is not artificially fed, or the breast milk pumped out and fed with a spoon, medicine-dropper, or from a bottle, the prostration increases rapidly and the child dies from starvation. **Gavage** should be resorted to if the child cannot nurse or shows a disinclination to swallow, as often happens.

QUESTIONS.

What is icterus neonatorum? What are the theories of its causation? What are the symptoms?

To what is sepsis of the newborn due? What systemic symptoms are present? What is the treatment?

Define ophthalmia neonatorum. What is the cause? What is the clinical picture presented? How is it prevented? Give the treatment in detail.

Define atelectasis. Describe its etiology and pathology. What physical signs are present? How prevented? Give treatment.

How are cerebral hemorrhages caused? Give the symptoms and treatment.

Describe cephalematoma. What is its pathology? How treated? How differentiated from caput succedaneum?

What may cause umbilical hemorrhage? How treated? Describe the granulating navel. How is it treated?

What is melena? What are the symptoms and treatment?

How does an umbilical hernia develop? What is the treatment?

What is tetanus neonatorum? how caused? What is its symptomatology? How prevented? Give the treatment, local and general.

Describe mastitis occurring in the newborn. What are the symptoms and treatment?

What is sclerema? Give its pathology and cause. What are its symptoms and prognosis? How treated?

What is the significance of a rise in temperature of a newborn baby? How demonstrated to be due to starvation?

CHAPTER X.

DEFORMITIES OF THE NEWBORN.

HARELIP AND CLEFT PALATE.

A **harelip** results from an imperfect closure of the maxillary and intermaxillary bones, there being a failure of union of the central process with the lateral. The fissure is generally to the side of the median line and may extend into the nose. If the harelip is double, the maxillary bone usually protrudes, in which, not infrequently, there is inserted a tooth present at birth.

A harelip is the most frequent of the congenital deformities, and may interfere materially with a child's nursing.

A **cleft palate** may exist alone, but it is generally associated with a harelip. It may involve the soft palate only, or extend through the whole length of the hard palate. As the child is unable to form a vacuum in its mouth because of the communication with the nasal cavity, sucking is practically impossible.

Treatment is surgical—the cleft palate being repaired about the second or third month, the operation on the harelip being deferred until the second year, provided the child may be nourished; otherwise it should be attempted earlier. An artificial palate of rubber-sheeting has been devised for attachment to the nipple to enable the child to nurse. Some severe cases require gavage for providing nutrition.

TONGUE-TIE.

Tongue-tie is rather a common affection; it is an abnormal shortness of the frenum, making it impossible for the child to protrude its tongue between the lips.

Treatment.—The frenum is clipped at its edge with scissors and then torn with the finger until the tip is sufficiently liberated.

ANKYLOGLOSSIA.

Synonym.—**Adhesio linguæ.**

Definition, Symptoms, and Treatment.—Ankyloglossia or **adhesio linguæ** is an abnormal adherence of the tongue to the floor of the mouth, an exaggeration of tongue-tie. It can only be liberated by a plastic surgical operation.

HYPERTROPHY OF TONGUE.

Symptoms.—The tongue may be enormously enlarged, supposedly due to a lymphatic disease, and must be **diagnosed from cretinism,** which may be done from the lack of symptoms of the latter condition.

The **treatment** is surgical entirely. Astringents are of no avail.

SPINA BIFIDA.

Definition and Varieties.—In this condition there is an imperfect closure of the laminæ of the vertebræ allowing the protrusion of: (1) the **membranes** only, a **meningocele**; (2) **meningomyelocele,** the membranes forming the sac in which is protruded the cord itself; and (3) **syringomyelocele,** in which the fluid is accumulated in the central canal of the cord, the whole protruding through the open laminæ.

Symptoms.—The tumor present at birth, is usually found in the lumbar or sacrolumbar region. If pressure is made on the skull, or if the child cries, thus increasing intracranial pressure, the tumor enlarges. Paralysis is often present in the latter two forms, **meningomyelocele** and **syringomyelocele,** there being complete paraplegia including the rectum and bladder. The tumor steadily increases in size, may rupture, or become infected—an abscess resulting or a meningitis.

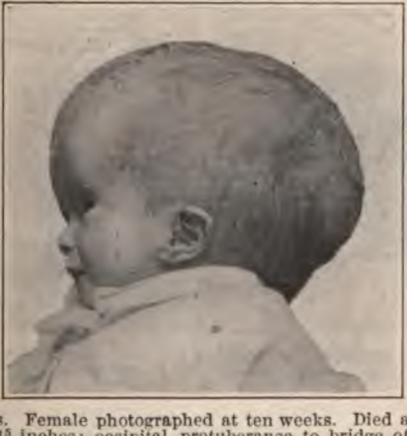
Prognosis in the first variety is not very unfavorable; in the others, if paralysis exists, it is very unfavorable. If associated with hydrocephalus, as it frequently is, it is grave. Death usually occurs early, and is due to marasmus, infection, and meningitis, or rupture with convulsions as the fluid drains away.

Treatment is by surgical measures in those cases in **which there is no paralysis.** Operate early, in the meantime protecting the tumor against pressure. The operative procedures recommended are aspiration and injection of an irritant to cause an adhesive inflammation of the sac. Morton's fluid (composed of iodine, gr. x; potassium iodide, gr. xxx; glycerin, ℥j) is injected after aspiration, 1 drachm being used at each sitting. Ligation and excision of the sac are practised in cases of this type. In order to prevent an undue escape of the cerebrospinal fluid some operators carry out the interference and after-treatment with the child lying on its abdomen with head and chest lowered.

HYDROCEPHALUS.

Varieties.—Hydrocephalus, commonly known as **water on the brain,** may be of the **external** or **internal** variety. In the external form, which is rare, the fluid is external to the brain and is usually secondary to other conditions, as a tuberculous

FIG. 17.



Hydrocephalus. Female photographed at ten weeks. Died at eighteen weeks. Circumference, 24⅝ inches; occipital protuberance to bridge of nose, 20 inches; 5½ pints fluid aspirated postmortem.

meningitis. In the internal form—commonly called **chronic hydrocephalus**—the usual variety is a collection of fluid in the ventricles of the brain, and is either congenital or acquired. If the former, it is frequently the cause of a dystocia. This is the most frequent form. Syphilis is the usual **cause**. In the acquired form the cause is practically unknown.

FIG. 18.

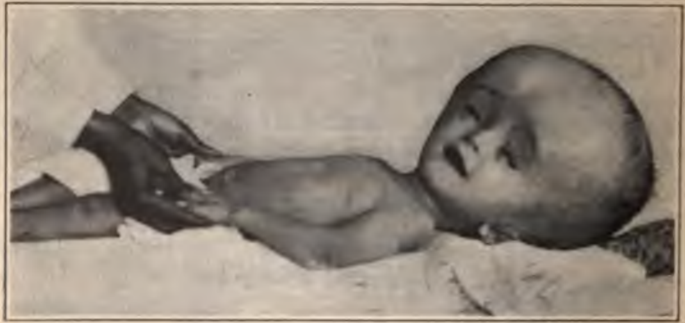
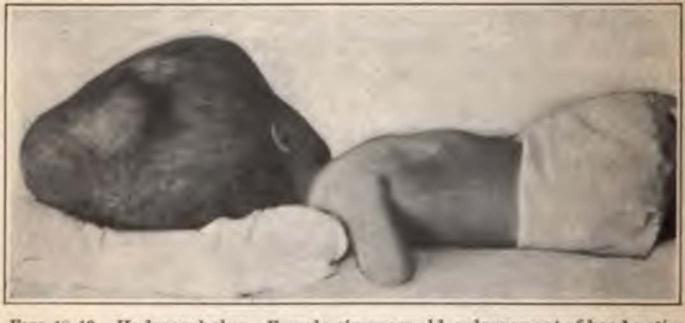


FIG. 19.



FIGS. 18, 19.—Hydrocephalus. Female, six years old, enlargement of head noticed at six weeks: circumference, 32¼ inches; occipital protuberance to bridge of nose, 29 inches.

Pathology.—The fluid is usually straw colored, specific gravity 1005 or less, containing chlorides, phosphates, and albumin.

The ventricles and the communications between them are enlarged, and the brain-substance is gradually thinned; the sutures and fontanelles of the skull are widely separated.

Symptoms.—The head is enormously enlarged in most cases, the forehead high, the face relatively small, the head cannot be held up, the eyes look downward, the upper lid does not cover the upper portion of the ball; there are nystagmus, frequently strabismus; wasting of the body; spina bifida is often an associated deformity; the progress is chronic, and recovery never occurs. Should the process cease early, the symptoms improve and the child may grow to adult age but with mind impaired.

Treatment is unsatisfactory; operative interference and strapping of head are not indicated. Tonics, potassium iodide, and codliver oil constitute the medicinal means.

MENINGOCELE.

Definition and Varieties.—**Meningocele** is a protrusion of the membranes of the brain through an opening in the skull. In an **encephalocele** there is a protrusion of a portion of the brain substance through an opening, this being connected with the rest of the brain by a small pedicle; a **hydrencephalocele** is a protrusion of a portion of the brain-substance containing a cavity communicating with one of the ventricles and filled with fluid. **Encephalocele** is often termed **hernia cerebri**, the protrusion occurring most frequently through the frontal and occipital bones. It is a congenital deformity; pulsating; increases in size with crying; and convulsions follow its reduction into the cavity.

Treatment.—A **meningocele** may be aspirated and injected with Morton's fluid (see p. 89) or the sac may be ligated. **Encephalocele** may be treated by reduction and compression afterward. There is practically no treatment in the other variety.

A **cyclops** is a child in which only one orbit is present, this being in the middle of the forehead at the root of the nose.

In **anencephalus** and **hemicephalus** there is a complete or partial absence of the brain-substance.

Porencephaly indicates a hole in the brain, which may be caused by defective development, or due to disease. Congenital porencephaly may be single or double and in any portion of the brain; hemorrhage is most frequently the cause of the acquired form.

Microcephalus indicates a condition in which the whole brain shows defective development. There may be primarily a small skull with resulting small brain. The operation suggested by Lannelogue of making a linear opening on either side of the longitudinal sinus has not met with favor as a remedy for microcephalus. It is no longer countenanced by neurologists or surgeons.

CLUB-FOOT.

Varieties.—This deformity is frequently encountered, alone or associated with hydrocephalus and spina bifida. The simple forms are **talipes varus, valgus, equinus,** and **calcaneus,** the compound varieties **talipes equinovarus** and **calcaneovalgus.** It may affect one or both feet. Their description belongs to orthopedic or general surgery.

Treatment is effectual if begun early—immediately after birth, with the application of the proper appliances, obviating the necessity of a tenotomy.

IMPERFORATE RECTUM OR ANUS.

Imperforate rectum or anus, if present, should be found upon birth of the child.

It is **recognized by** no passage of meconium and by the routine digital exploration of the anus and lower rectum. The child cries constantly; distention of the abdomen followed by collapse and death unless relieved by operative interference. The anus may be well formed and cut off from the bowel by a membrane, a **proctodeum.** The rectum may be deficient for a varying distance from the anus, communicating by an imperforate cord; or the rectum may be complete and the anus imperforate. The rectum may terminate in the vagina, the urethra of the male, or in the bladder.

Treatment.—Incision of the thin septum and dilatation with finger or bougie are all that is needed in most cases. Dissection, under chloroform, in search of the rectal pouch may be necessary. If unsuccessful, an artificial anus must be made. Death is usually due in these operative cases to peritonitis or failure to relieve.

MACROSTOMA.

Macrostoma is a congenital enlargement of the mouth. It is usually unilateral, but may involve both sides. It **is due to** a failure of union of the superior maxillary with the fronto-nasal and external nasal processes. It is **treated** by paring the edges and uniting them.

MICROSTOMA AND MACROCHEILIA.

Microstoma is the opposite condition of macrostoma, a congenitally small mouth. Plastic **operation** yields good results.

Macrocheilia is a condition of congenital enlargement of the lips, and is due to an excessive lymphatic growth or an enlargement of the glands.

EXSTROPHY OR EXTROVERSION OF THE BLADDER.

Definition, Cause, and Symptoms.—Exstrophy or extroversion of the bladder is a congenital deformity due to a deficient closure of the abdominal plate, leaving the posterior wall of the bladder exposed and uncovered by abdominal wall. The posterior wall of the bladder, red and thrown into folds, may be flush with the abdominal wall; the orifices of the ureter may be seen, from which urine constantly drops. The deformity occurs more frequently in males. The symphysis pubis is often ununited.

Treatment other than surgical is of no avail. This requires most careful plastic surgery, and should be first attempted when the infant is five or six months old. In older children a urinal may be fitted and worn very comfortably.

EPISPADIAS.

Symptoms and Treatment.—The urethra opens at some place in the extent of the dorsum of the penis, or there may be a complete failure to close of the entire dorsum of the penis. A plastic operation may cure.

HYPOSPADIAS.

This is a deformity due to a deficiency in the floor of the urethra and may be extensive or involve only a small area. The corpus spongiosum is also involved. The nearer to the normal site of the meatus in the penis the urethra opens the less surgery is indicated.

CRYPTORCHIDISM.

Definition.—The testicles should have descended into the scrotum by the time of birth. In **cryptorchidism** both testicles are retained within the abdomen, in **monorchidism** one testicle is retained.

Varieties.—In monorchidism the retained testis may remain in the body-cavity, in the canal, or the upper part of the scrotum.

Symptoms.—If in the cavity, nothing will happen; but if caught in the inguinal canal, pressure may be exerted on them, causing serious complications. If subjected to much pressure, they may be undeveloped and functionally inactive, but this need not necessarily be the case. If retained in the canal, herniæ are apt to result. An undescended testicle is often mistaken for a hernia and a truss applied. The condition is easily diagnosed, examination of the scrotum being confirmatory.

Treatment in young children should be gentle attempts to bring the undescended testis into the scrotum, with protection against injury. Operations may succeed in relieving adhesions, if they exist, and placing the testicle in the scrotum. When inflamed in its undescended position, it should be removed, and if a strangulated hernia coexist with an undescended testicle and adhesions between them are present, it should be *removed* with the sac.

HYDROCELE.

Causes and Varieties.—Hydrocele may be present at birth, and is an accumulation of fluid in the *processus vaginalis,* and with it the funicular process is distended. The fluid may communicate with the peritoneal cavity if the opening remains free, but this is not often found. An encysted hydrocele of the cord may be present.

Diagnosis.—Eliminate the presence of **hernia** by finding there is no thickening of the cord above; a hydrocele is soft, fluctuating, elastic, and translucent. An **encysted hydrocele** of the cord may be brought down by traction on the cord; there is no distinct impulse in hydrocele. In girls a collection of fluid in the canal of Nuck may be found.

Treatment.—Many get well without treatment, or with slight massage over the tumor or painting with tincture of iodine. Simple aspiration followed by irritation of the inner walls of the sac with the point of the needle will generally result in a cure, or an injection of carbolic acid (Schering's crystals—dissolved in glycerin, 3 minims) into the sac after evacuation will always result in a cure.

TORTICOLLIS.

Causes.—Torticollis (**wryneck**) is frequently met with in childhood and may be encountered quite early. It may be congenital, in this case being due to maldevelopment. Injuries at birth may cause it, a sternomastoid tumor being often present early. It may be spasmodic, follow suppuration in the neck, or follow burns, the latter being due to a cicatrix.

Treatment.—Manipulations may permanently relieve the condition if begun early, and later a tenotomy of the *opposing structures* may be found necessary.

FLAT-FOOT.

Definition.—Flat-foot is often found in infants, known also as **pes planus** or **spurious valgus.**

It may be **due to** a congenital weakness of the ligaments of the arch of the foot, permitting a dropping, or be acquired from a heavy child being kept overmuch on its feet. Instead of the footprints showing an outline of the outer border of the foot with the heel and ball, it shows an outline of the whole foot, all of the foot touching the floor.

The **treatment** is essentially orthopedic, and requires manipulation and the application of proper supports in the shoes when the child is on its feet. Later in life it is an extremely painful condition.

QUESTIONS.

Describe harelip and its varieties.
Describe a cleft palate.
How do these interfere with nutrition?
How are they treated?
What is tongue-tie, and how is it treated?
Describe ankyloglossia.
Describe lingual hypertrophy.
Define spina bifida. Name and describe the varieties.
What is the prognosis and how is it influenced?
What operative procedures have been recommended?
Define hydrocephalus. How many varieties? Describe its pathology and the character of fluid.
What symptoms present? Give the treatment.
What constitutes a meningocele?
Name and describe the varieties.
What is the treatment?
Define cyclops, porencephaly, anencephalus, hemicephalus, microcephalus.
Describe the varieties of imperforate rectum.
How are they treated?
Describe the varieties of club-foot. How are they treated?
Describe macrostoma and state its causation.
Define microstoma and macrocheilia.
To what is exstrophy of the bladder due? How is it treated?
What is epispadias? How treated?
Describe hypospadias.
Define and describe monorchidism. Cryptorchidism.
How treated? What precautions should be noted in the treatment?
What is a hydrocele? What is the analogous condition in girls?
How are they treated?
Describe torticollis and give the treatment.
Describe a flat-foot and give the treatment.

CHAPTER XI.

DISEASES OF THE DIGESTIVE SYSTEM.

DISEASES OF THE LIPS.

HERPES.

HERPES (**fever blister**) is of common **occurrence** in children, complicating digestive disorders, pneumonia, and other infective diseases.

There are small vesicles on a raised or reddened area; these may coalesce forming one large blister over one or both lips. These rupture and form a crust or scab on the surface.

Treatment is rarely instituted except a drying powder which is dusted on the surface. Dry calomel makes a good application. The child should not be allowed to pick it—an infection often occurs in this way.

PERLECHE.

Definition and Symptoms.—Perlèche was named by Lemaistre in 1886. It is an ulceration or cracking of the mucous membrane at the angle of the mouth, beginning as a small fissure; as the irritation causes the child to lick the corners a small ulcer develops; when put on a stretch pain is caused.

Treatment.—Touching the fissure with a strong solution of silver nitrate (20 grains to the ounce of water) and dusting with bismuth subgallate or zinc oxide powder. At night zinc oxide ointment or vaseline covering the fissure prevents its encrusting with secretion. In winter these fissures give rise to a great deal of discomfort. If on any other part than the lip, a preparation called Frostilla, consisting largely of glycerin, is the most effectual remedy.

ECZEMA.

Symptoms.—Eczema of the lips is a common affection, and may amount simply to a slight dryness, roughness, and thickening of the vermilion border, or the lips may be cracked and fissured, and covered with serum and blood. The condition is quite painful and frequently prevents a child from nursing. It may be part of a general eczema of the face, but beginning on the lips. It frequently itches and a child will rub and irritate the parts.

Treatment.—Prevent irritation by rubbing. Fasten hands of the baby to the dress or cover them with mittens. Apply the following ointment:

℞ Resorcin,	gr. viij;
Acidi salicylici,	gr. ivss;
Unguenti aquæ rosæ,	
Ung. zinci benz. oxidi,	āā ℥ss.

M. ft. unguentum.
Sig.—Apply to lips with gentle friction.

DISEASES OF THE TONGUE.

EPITHELIAL DESQUAMATION.

Synonyms.—Lingual desquamation; Geographical tongue.

Its **origin** is probably parasitic, occurring mostly in bottle-fed babies. It **occurs as** an epithelial thickening on the dorsum and on the borders of the tongue. These areas turn a gray color and subsequently desquamate, leaving a shining area of mucous membrane. These gradually assume the color and appearance of the normal tongue, new desquamative patches appearing.

Its **duration** is indefinite; it causes no special discomfort and requires little **treatment** beyond antiseptic washes of borolyptol or boric acid in saturated solution.

GLOSSITIS.

Definition.—Glossitis is an inflammation of the tongue, and follows an injury—as biting, as often occurs in convulsions of children, the wound creating an avenue of infection.

Symptoms are swelling of the tongue, pain, dysphagia, salivation, dyspnea, slight elevation of temperature, restlessness.

Treatment.—Cold; ice either internally or externally; fluid food, given through catheter introduced into stomach through nose; scarification of tongue if dyspnea is marked.

DISEASES OF THE MOUTH.

STOMATITIS.

Varieties.—Stomatitis is divided into **catarrhal, hepatic,** and **ulcerative** forms. (See table on p. 100.)

The following formulæ are of service in all these conditions.

℞	Thymol,	gr. vj;
	Acidi boracic,	℥ss;
	Spiritus rectificati,	℥ij;
	Aquæ destillatæ,	q. s. ad Oj.

℞	Thymol,	gr. iv;
	Sodii benzoatis,	ʒiv;
	Olei eucalypti,	ʒij;
	Aquæ destillatæ,	q. s. ad Oj.

For the aphthous form:

℞	Potassii chlorati,	℈ij;
	Tinctura ferri chloridi,	fʒj;
	Syrupi simplicis,	fʒvj;
	Aquæ cinnamomi,	f℥ij.

M. et fiat solutio.

Sig.—Teaspoonful every two hours; two-year child.

GANGRENOUS STOMATITIS.

Synonyms.—Noma; Cancrum oris; Cancer aquaticus; Gangrene of cheek; Wangenbrand.

Definition.—Gangrenous stomatitis is a gangrenous process generally beginning at the border of the gum and spreading

	Catarrhal stomatitis.	*Herpetic stomatitis.*	*Ulcerative stomatitis.*
Synonyms	Simple erythematous stomatitis.	Aphthous, herpetic vesicular, follicular, croupous stomatitis.	Stomatitis ulcerosa, stomacace; putrid sore mouth; *Mundfaule.*
Causes . .	Irritants; traumatism; heat; secondary to exanthemata; teething; rough efforts at cleaning mouth.	Gastro-intestinal derangements; cold; irritating objects in mouth; herpes elsewhere, nervous origin; teething.	Metallic poisons (mercury, arsenic, lead),sequel to infectious diseases; poor hygiene and food; carious teeth; scurvy.
Pathology	Hyperemia; desquamation buccal mucous membrane; salivation; usually superficial.	Vesicles on cheeks, lips, and tongue, not on gums; appear in crops; superficial; hyperemia associated.	Appears on any part, most frequent on outer surface of gum about a tooth; mucous membrane swollen and livid; ulceration may be deep, limited to mouth; periostitis and loosening of teeth may occur.
Symptoms	Heat, redness and swelling of mucous membrane; dryness followed by salivation; fretfulness; disinclination to nurse; tongue coated and red edges; enlargement of lymphatic glands; deranged digestion; in robust children short duration; in weakened, longer duration and may be serious from interference with feeding.	May follow catarrhal form; characteristic lesion; superficial ulcers, a few or many; increased secretion; pain and restlessness; lymphatic glands swollen and tender; lasts two weeks or longer.	Pain, fretfulness, crying; increased flow of saliva with fetid odor; surfaces bleed easily; tongue thickly coated and swollen; dirty deposit on teeth; may be ulceration of jaw and sequestration; large and tender glands; may last months if neglected; gangrenous form may supervene.
Treatment	No internal medication needed; ice to suck; alkaline mouthwash of Dobell's solution; saturated boric acid solution or weak borolyptol: gavage when needed.	Regulate diet; wash with potassium permanganate gr. iij to ℥j; potassium chlorate gr. ij every three hours internally, well diluted; silver nitrate or alum to ulcers.	Remove cause; improve hygienic surroundings; frequent washings with dioxygen; potassium chlorate, almost a specific, as it is excreted by the buccal mucous membrane. Silver nitrate to ulcers.

rapidly to the mucous membrane of the cheeks and lips. Perforation of the cheek may occur with necrosis of sufficient of the alveolar process to loosen the teeth.

Etiology.—It is generally secondary to infectious and weakening diseases, rarely developing in healthy children. Ulcerative stomatitis may precede. Streptococci and diphtheria bacilli may be found in the area; the affection occurs usually between two and five years of age.

Pathology.—Changes usually begin in the mucous membrane near the gums; there is first a hardness followed by softening and rapidly spreading gangrene. An extensive slough may separate, leaving a large granulating area. Bronchopneumonia and nephritis may follow.

Symptoms.—Fetid breath at first; pain, especially on eating, later there is little; prostration; high temperature; rapid feeble pulse; diarrhea; fetid discharge from mouth; appearances indicated under pathology.

Prognosis.—Death occurs in about 75 per cent.

Treatment.—Careful treatment of milder stomatitis may prevent this form; delay in active treatment results fatally. Under general anæsthesia the sloughing area and all necrotic places should be thoroughly cauterized with Paquelin's cautery. Any milder caustic is of no avail. The cauterization should extend beyond the diseased area. Daily touching the area with silver nitrate or nitric acid, followed by antiseptic washes, is indicated if there is any sign of improvement. Active stimulation, strychnine, and concentrated food are indicated also.

THRUSH.

Synonyms.—Sprue; Soor; Muguet; Parasitic stomatitis.

Physical Signs.—In this form of stomatitis small white particles resembling milk curds appear on the mucous membrane of the tongue, gums, and cheeks.

Etiology.—The *Saccharomyces albicans*, and not the *Oïdium albicans*, is known to be the cause of this condition. Fine threads (mycelium) and small oval bodies (the spores) are seen under the microscope, if a patch be examined, upon which has previously been placed a drop of liquor potassæ. The parasite develops between the interstices of the mucous membrane forming the curd-like mass, always upon a mucous membrane which is abnormal. The spores exist in the atmosphere and are carried to the mouth by nipples, toys, sugar-teats, etc. Small pearly-white spots develop; they coalesce, covering the whole mouth, buccal mucous membrane, esophagus, and stomach unless treated properly.

Symptoms are included in the description of the appearance of the mouth. In addition to the patches the mouth is usually dry and the tongue coated; food is generally refused.

Treatment.—Prophylaxis is most essential, and this is always possible by attention to cleanliness of the child's mouth, breast and nipples of mother, bottles and nipples. In washing the mouth care should be exercised to use no force. Boric acid is a specific and used in saturated solution will cure all cases.

GONORRHEAL STOMATITIS.

Gonorrheal stomatitis **resembles** a severe catarrhal stomatitis, and may be **diagnosed only by** a microscopical examination of the discharge. The **treatment** is the same as in thrush. **Prophylactic care** of the patient's eyes must be carried out.

SYPHILITIC STOMATITIS.

Syphilitic stomatitis occurs often, but these lesions are practically never seen without other symptoms of hereditary syphilis. The essential lesions are mucous patches in the mouth, ulcers and fissures about the lips. Diagnosis is of importance for various reasons.

RANULA.

Definition.—Ranula is a cyst forming under the tongue on either side of the frenum, varying in size, but may be sufficiently large to interfere with deglutition.

The duct of one of the mucous glands is occluded. It may be single or multilocular.

Symptoms.—The growth is painless, fluctuates, and is the color of the buccal mucous membrane. Glairy mucus is found when the contents are evacuated.

Treatment.—Cut off the top of the cyst-wall, evacuate the contents, and cauterize the sac with silver nitrate or iodine.

GINGIVITIS.

Definition.—Gingivitis is an inflammation of the gums.

It rarely occurs as an independent condition, and is associated either with ulcerative stomatitis or alveolar abscess, or as a manifestation of scorbutus. If dentition has progressed, the gums recede from the teeth, are red and ulcerated in appearance, swollen, and bleed easily.

Treatment.—Cleansing, antiseptic washes, potassium chlorate internally, and treatment of any general condition which may be responsible for the symptoms.

ALVEOLAR ABSCESS.

Occurrence.—Alveolar abscess is a common condition in children, especially in hospital inmates and frequenters of out-patient departments who pay no attention to care of the teeth.

Symptoms.—The first indication of trouble is generally pain, followed soon by swelling of the cheek over the affected part and soon of the whole side of the face. The gum is found much swollen and very hard opposite the tooth at fault. Pus may be pressed out of the gum beside the affected tooth and suppuration may be free.

Treatment.—The most important is the preventive, but when an abscess does form free drainage should early be established and the parts thoroughly irrigated with pyrozone or hydrogen dioxide. Hot water in the mouth and externally is most grateful. Broken or carious teeth should be extracted.

ACUTE PHARYNGITIS.

Acute pharyngitis may be **primary** or **secondary.** The mucous membrane of the whole pharynx is involved.

Etiology.—Disturbance of digestion is a frequent contributing cause; the rheumatic diathesis; exposure to cold.

Pathology.—Swelling of the mucous membrane of the pharynx involving tonsils, uvula, posterior wall of the pharynx, and often the larynx. There are the usual signs of inflammation, swelling and dryness of the mucous membrane, followed by increased secretion of mucus.

Symptoms.—Pain, especially on swallowing; vomiting; temperature 103° F. or above; dry cough. These symptoms continue three or four days, the tendency being to a natural recovery.

Diagnosis is from a simple process or a beginning scarlatina. In measles there may often be seen the buccal eruption described by Koplik.

Treatment.—Calomel in the diseases of the pharynx is a most valuable drug; but if this is ineffectual in opening the bowels, a dose of oleum ricini is indicated. Keep the child in bed on fluid diet; crushed ice at frequent intervals; cold "pack," made of flannel wrung out of cold water, over the throat extending to the lobes of the ears, and confined by wider dry flannel over the top of the head and pinned securely; a hot mustard bath is a valuable agent if temperature is high. If the child is old enough, an antiseptic spray—Seiler's solution—is of assistance.

ELONGATED UVULA.

Definition.—Elongated uvula is either congenital or follows frequent attacks of acute pharyngitis in which there is involvement of the uvula.

Generally the muscle is not elongated—simply an elongation of the mucous membrane.

Symptoms.—Whenever present, an annoying and more or less persistent cough is caused, especially when recumbent, together with snoring.

Treatment by astringent applications is of no avail, and the condition may be relieved only by cutting off the tip of the uvula. Care should be exercised not to remove too much tissue, as the tendency is to atrophy after the excision.

TONSILLITIS.

The **acute catarrhal tonsillitis** is rarely seen alone, but **occurs** with acute pharyngitis.

Follicular tonsillitis is frequently seen, the inflammation beginning in the crypts of the tonsil, which are filled with cast-off epithelium.

Etiology.—An inflammation due to the streptococcus or staphylococcus; occurs in children predisposed, they being of the so-called scrofulous diathesis. Exposure is a factor, rheumatism a predisposing cause.

Lesion.—The cocci produce an inflammation, and as a result epithelium is rapidly thrown off and the crypt fills with it mixed with mucus and bacteria. Yellowish-white masses appear on the surface of the tonsil and often coalesce there, making it difficult to differentiate from diphtheria. The tonsil itself is swollen.

Systemic Symptoms.—Chill or rigor, rapid rise of temperature to 102° or 105° F., general aching, in back and legs especially.

Focal Symptoms.—Inspection shows large red tonsils, with the spots appearing in a few hours. The spots are easily rubbed off even after coalescence, a differentiating point from diphtheria. But few diseases, at first local, cause so marked general symptoms. Duration is from three to four days, the throat symptoms persisting several hours after subsidence of the general symptoms. Only one tonsil may be affected.

Treatment.—Ice and cold packs to throat externally; no other local treatment needed; in older children the application of Löffler's solution to the tonsil reduces the congestion and the pain. Internally salol, 3 to 5 grains, every three or four hours, combined with phenacetin if there is a great deal of pain or if the temperature is very high. Aspirin is also beneficial. Cold sponging is of great benefit. Salicylates (spe

CHRONIC TONSILLITIS.

Causes.—Chronic tonsillitis, or **hypertrophied tonsils**, very often follows an acute tonsillitis of the catarrhal or follicular variety. The enlargement is permanent, due to hypertrophy of the lymphoid tissue, also to an increase of the connective tissue. In the majority of cases there is an associated hypertrophy of the tissue in the vault of the pharynx, so-called **third** or **Luschka's tonsil** or **adenoids.** In **adenoids** when existing alone the child is apt to be the subject of "**lymphatism,**" occurring frequently in several children in the same family. The growth is located chiefly on the posterior pharyngeal wall above the soft palate, a mass like a bunch of grapes, of greater or less size. The growths are soft and spongy and bleed easily.

Symptoms.—**Chronic tonsillitis** and **adenoid vegetations** are so closely associated clinically that their symptomatology is also allied. There are catarrh of the nasopharynx and all the symptoms of obstruction. There are restlessness at night, snoring, mouth-breathing, and if it exists for any length of time there is a change in the shape of the face, the so-called "hatchet face," pinched expression about the nose. The voice is nasal and thick. Following the least change in the weather the child "catches cold," and at the same time there may be an interference with the function of the ear, deafness, or pain. The chest is apt to show the "pigeon breast" deformity. Pulmonary diseases are very prone to develop in these children. The symptoms improve in summer.

Treatment.—No good can possibly result from internal medication, looking to a removal of the growth; it must be thoroughly removed either with or without a general anesthetic. Opinion is divided among authorities in regard to the safety of anesthetics in this operation. Ether has many advantages over chloroform and some disadvantages.

With head well over the edge of table, that it may be lowered to prevent aspiration of the blood, hemorrhage being generally profuse, the mass is cut out with Löwenberg's forceps and the remnant of the growth finally curetted with Gottstein's curette. The operation can not be done without the mouth-gag, and it should not be done with the child in the sitting position unless gas is given, and this is not without risk. After the operation crushed ice or ice cream, in a reasonable time after the anesthesia, is grateful to the throat. Keep the child in bed for a day or so and in the house for several days. The internal administration of some of the iron preparations is indicated after these operations, either the syrup of iodide of iron or the tincture of the chloride of iron in glycerin and water.

The importance of close scrutiny of the heart in all cases of tonsillitis can not be too strongly emphasized.

PERITONSILLAR ABSCESS.

Synonyms.—Phlegmonous tonsillitis; Suppurative tonsillitis; Quinsy; Quinsy sorethroat.

The **cause** of this condition is an infection of the tissues behind and around the tonsil with pus-producing organisms, it frequently following a mild follicular tonsillitis. One attack predisposes to subsequent ones. It is infrequently found in young children, though it may occur as a complication of or sequela to the exanthemata, especially scarlatina.

Lesions.—There is an inflammation of the cellular tissue around the tonsil or rarely invading the tonsil itself. Resolution may occur without pus formation, but this is the exception. The tonsil is pushed forward, the whole of the soft palate being infiltrated and boggy, the abscess frequently rupturing at the anterior faucial pillar.

Symptoms.—The general symptoms are those of pus absorption from any other locality, chill or rigor, fever, headache, backache. The local symptoms are quite severe. The pain is great at all times, but worse when talking or swallowing. There is frequently pain in the ear, the voice is thick and nasal, and mucus flows from the mouth continuously. The jaws can not be separated widely and there is a swelling of the neck on the affected side. A finger in the mouth pressed against the boggy soft palate above the tonsil detects a soft, fluctuating swelling.

Treatment.—We do not believe this condition can be aborted by the administration of antirheumatics given internally, but as quinsy and the rheumatic diathesis are closely allied they can do no harm. The only treatment which gives permanent relief is a free incision for the evacuation of the pus. This may be successful in locating the pus and it may not. The pus points in the direction of the least resistance, and may rupture spontaneously low down on the lateral wall of the pharynx. The duration varies from three to ten days. Temporary relief is often obtained from the application of heat externally to the affected side.

RETROPHARYNGEAL ABSCESS.

Synonym.—Retropharyngeal lymphadenitis.

Lesions.—There is primarily an inflammation of the lymph-nodes along the posterior wall of the neck, also involving the connective tissue surrounding, with formation of pus, or pus may form in the mucous cysts in the neck. There may be severe inflammation without the formation of pus.

Etiology.—Caries of the spinal vertebræ; injuries; pharyngitis; following the exanthemata, especially scarlatina; an infection of the glands from a previous nasal catarrh; delicate children are more often subject to it; diphtheria; a tuberculous inflammation of the glands themselves.

Systemic Symptoms.—Fever 102° or 103° F., perhaps preceded by a rigor; difficulty in swallowing; pain; restlessness; dyspnea; snoring when asleep.

Focal Symptoms.—Examination of the pharynx shows a bluish color of the mucous membrane; a swelling generally to the side of the median line on the posterior wall.

In abscess complicating disease of the cervical vertebra the onset is gradual and the abscess may encircle the posterior pharyngeal wall. If left untreated, it may rupture spontaneously externally or internally.

Prognosis is always serious, especially when complicating spinal caries.

Treatment.—As soon as pus forms, make free incision. The possibility of pushing the pus down so that pressure made on the larynx and trachea is enough to cause fatal obstruction to respiration, must be remembered. One such case came under the writer's observation in which intubation was successfully practised after severe cyanosis was present. In the tuberculous form the abscess should be opened from outside. When opening is made internally, it should be done by a guarded bistoury, the child held upright by an assistant, and head thrown forward quickly to allow pus to escape and prevent its aspiration into the lungs.

FOREIGN BODIES IN THE MOUTH AND THROAT.

Varieties and Symptoms.—Foreign bodies, such as coins, buttons, jackstones, tacks, pins, pieces of bone, etc., are frequently swallowed by babies, and when present cause pain, retching, and cough. *Oftentimes they may be felt from the outside.* If below a point where this may be done, a **radiograph** will locate the object, and even if the diagnosis is made when situated low down, this procedure is to be recommended as giving great assistance in operating.

Treatment.—The body may sometimes be pushed into the stomach by an esophageal bougie. If passed into the stomach, do not give a purge or emetic. The writer observed a child recently who swallowed an open safety-pin, the second size, measuring one inch from point to shield. It gave no discomfort and was passed on the ninth day. There was pain when it passed through the cecum. A radiograph showed the pin lying to the left of the spinal column and either in the stomach or the transverse colon; it proved to be in the colon, as it was passed a few days later. This case is mentioned to illustrate how large a body can pass through the gastro-intestinal canal successfully.

A child who has swallowed a foreign body should be fed on a generous diet which leaves in the intestine a large amount of residuum. Nothing is better than *old-fashioned* oatmeal. The residuum will form about the foreign body into a mass which will be passed safely. The editor saw a case do perfectly well on this treatment in which the child had swallowed many fragments of broken glass.

ACUTE ESOPHAGITIS.

Definition.—Acute esophagitis, as the name implies, is an inflammation of the esophagus, due to an irritation such as the passage of a foreign body, some hot corroding substance, as lye, acids, etc.

Symptoms are pain increased by swallowing, retching, and vomiting. The results are often serious, a stricture being the most frequent sequela encountered, though this may not occur for two or three months. There may be immediate danger of suffocation from the great swelling of the esophagus and larynx at the time of swallowing the irritant.

In stricture of the esophagus there may be muscular spasm, which is increased by the passage of bougies. This may be accomplished only under a general anesthetic. A careful examination should be made to ascertain the number, size, and location of the strictures, using great care in the instrumentation. Mackenzie has stated that the distance from the gums to the cardiac orifice is about seven inches.

Treatment.—The following procedures have been recommended: no food by the mouth, supporting the child by rectal enemata (the freedom from irritation of the affected area by passage of food under this treatment causing relief of the muscular spasm); gradual dilatation of the stricture by bougies; forcible dilatation by dilators; esophagostomy, if stricture is in upper part of the œsophagus, or a gastrostomy if it is lower down. These cases do well after a gastrostomy, it being possible to close the gastric fistula after a considerable time.

FISTULA OF THE NECK.

Cause and Signs.—A **congenital** fistula of the neck is **a** failure to close of the second or third branchial cleft, an opening persisting in the neck above and a little to the outside of the sternoclavicular joint, and usually communicating with the œsophagus. If the external opening closes, there may be accumulation of mucus, forming a mucous cyst. If drainage is free, the discharge is troublesome.

Treatment is surgical entirely.

DISEASES OF THE STOMACH.

DIGESTION IN GENERAL.

Digestion in the infant **differs from adult digestion.** The saliva is secreted in very small quantities up to the third or fourth month, and is secreted in much larger quantities after the cutting of the teeth. The stomach does not play a large part in digestion, its principal duty being to convert the proteids into peptones, albumoses, and acid albumin, this being accomplished by pepsin, hydrochloric and lactic acids.

As soon as milk is ingested, it coagulates, human milk in small flocculi, cows' milk in larger masses. The addition of dextrinized gruels or cereals to cows' milk breaks up the large curds until they closely resemble the curds of mother's milk. The rennet ferment in the gastric juice is believed to be the coagulating agent.

The contents of the stomach pass into the duodenum, where digestion proceeds. The pancreatic juice further aids in the digestion of the proteids, carbohydrates, and fats.

Bacteria are absent from the stomach and intestines at birth, but rapidly multiply after gaining access through the mouth. The principal bacteria are **Bacterium lactis aerogenes** and **Bacterium coli communis**, the former non-pathogenic, the latter under certain conditions markedly so.

The **feces** first discharged are called **meconium.** They are black, of tarry consistence, disappearing in from three to five days, giving place to the yellow, smooth, soft fecal matter which makes its appearance as soon as milk is secreted. A child has from two to six such actions in twenty-four hours. Any deviation in the frequency, color, odor (which is never normally very great or offensive), consistence, and character, is an evidence of derangement.

Gastric disorders may be classed as **functional** or **organic,** which can not always be determined clinically. As a symptom **vomiting** is most frequently met with, and it may be due to many causes. The natural position, size, and conformation of the stomach predispose to regurgitation, the newborn infant's stomach having no difficulty in getting rid of its contents. It may occur as a **reflex symptom** due to a central lesion, as **cerebral irritation** or due to **peritonitis**; an **overloaded stomach**; **acute dyspepsia** or **indigestion**; **intestinal obstruction**; the **exanthemata** in their incipiency; **too frequent feeding**; and a condition known as **cyclic** vomiting.

FUNCTIONAL DISTURBANCES OF DIGESTION.

ACUTE INDIGESTION.

Synonym.—Dyspepsia.

Definition.—Dyspepsia is a disturbance of the function of the stomach without there being any appreciable lesion.

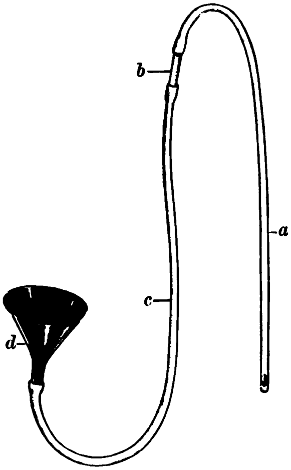
Etiology.—An inherited predisposition may exist; tuberculous parentage is a cause; improper food; too early weaning; change in breast milk from mental conditions; cows' milk containing too much casein; conditions which in themselves decrease the stomach's digestive power, as heat, fatigue, depression.

Pathology.—There is no lesion, the condition being entirely functional. There may be a diminution in the gastric juice, and the motor power of the stomach is lessened.

Symptoms.—Restlessness and languor, perhaps pain, relaxation of the skin, retching, and vomiting, which may occur early or not for twenty-four hours. As a result of indigestion the stomach is not empty for a number of hours, and the vomitus shows signs of fermentation and is sour; if the stomach is completely emptied by the vomiting, there is a cessation of the symptoms. There may be fever from 102° to 105° F., with symptoms of toxic nature; coated tongue; anorexia; diarrhea is usually present, stools showing curds and undigested food; occasionally distention of stomach; the pulse is weak and rapid.

Diagnosis.—From **gastritis**, not possible at onset; from the **exanthemata**, by appearance of the rash of the various diseases, in nowise like the so-called "stomach rash"; **pneumonia**, by physical examination.

FIG. 20.



Tuley infants' gavage set: *a*, infant stomach-tube; *b*, glass connection, valuable as indicator; *c*, rubber connection-tube; *d*, hard-rubber funnel, capacity 3 to 4 fluidounces.

Prognosis good except in the very young or in children prone to develop gastro-intestinal disturbances.

Treatment.—Empty the stomach, this being best done by a catheter with small section of a glass tube between and a funnel. This catheter is passed into the child's stomach without difficulty, the child being held on the attendant's lap, wrapped in a sheet, the stomach being washed by passing water in and out by siphonage. If unable to use stomach washing or it is contraindicated, give large quantity of water from a bottle, with or without an emetic, ipecac being the best emetic. Small doses of calomel are of great benefit, $\frac{1}{10}$ grain doses every fifteen minutes or every half hour until 1 grain is given.

Remainder of treatment dietetic, rest stomach absolutely, no milk for two or three days; egg-albumin-water or barley-water in six or eight hours, if necessary to feed and vomiting has ceased. Heat to epigastrium is useful if there is much pain. Broths may follow albumin-water before resuming milk.

GASTRALGIA.

Definition.—Gastralgia is sudden and severe pain in the epigastrium, considered a neurosis, but the exact cause is unknown.

Because of the inability of young children to locate pain it is frequently impossible to make a **diagnosis.** Gastralgia must be differentiated from diaphragmatic pleurisy, vertebral caries of the middorsal region, and neuralgia.

Treatment.—Relieve pain; give hot applications; counterirritate by mustard plasters; hot water internally with a few drops of chloroform or whisky; give purgatives. Between the attacks—if they have a tendency to recur—**arsenic** in the form of Fowler's solution is of benefit.

CYCLIC VOMITING.

Definition.—Cyclic vomiting is a nervous vomiting, believed to be due in some degree to the uric acid diathesis. There are periodical attacks of vomiting, generally cyclical.

Etiology.—Not primarily a disease of the stomach; may follow acute diseases; malaria. The presence of acetone in the blood is believed to be a causative factor.

Diagnosis.—Meningitis and nephritis must be excluded, the course of the symptoms eliminating the former, and urinalysis the latter; from indigestion, by the fact that in the cyclic form vomiting is persistent and does not necessarily follow ingestion of indigestible food.

Prognosis is influenced by frequency of recurrence and duration of attacks. Recovery generally occurs spontaneously.

Symptoms.—Attack may be preceded by pain and severe headache, lassitude, fever, clay-colored stools, followed shortly by vomiting varying greatly in severity in different individuals, generally, however, continuing several days. Exhaustion, pain, and abdominal tenderness remain.

Treatment.—Calomel in large doses is of use if given early with a saline for free purgation; but little can be done when vomiting has begun; antipyrin has been recommended. Bicarbonate of soda is advised, administered by the bowel. No food by mouth; broths and carbonated waters may be given when vomiting has ceased. Dietetic treatment between attacks; no sweets, limit starches, using meat, milk, stale bread, and fruits, with a liberal quantity of water.

ACUTE GASTRITIS.

Symptoms due to inflammatory changes in stomach-wall.

Etiology.—The same as those active in acute indigestion—errors in diet; exposure to cold; high temperature; exanthemata; influenza; toxic substances swallowed.

Pathology.—The mucous membrane is softened, swollen, and covered by thick mucus; is deeper red than usual, the capillaries swollen; the epithelium is shed, the tubules are filled with detritus.

Symptoms.—Onset similar to that of acute indigestion; severe vomiting, pain, and tenderness in epigastrium; fever to 104° F., dropping slowly to normal as the symptoms disappear; distention of epigastrium; exhaustion; diarrhœa following constipation, which usually precedes an attack; convulsions may occur; the attack lasts about a week.

Prognosis.—In the robust the prognosis is good; in the weak and poorly nourished the attack is generally fatal. It may develop into a chronic gastritis, a gastroduodenitis, or an enterocolitis, any of which may prove fatal to a young child.

Treatment.—Evacuate stomach ; best done by lavage ; baths or sponging for temperature ; sinapisms to epigastrium if pain is present. Starvation as long as possible, then give only the most easily digested food, albumin-water or whey, gradually returning to regular food when possible.

CHRONIC GASTRITIS.

Definition.—A chronic inflammatory change in the mucous membrane of the stomach, with interference with its functions.

Etiology.—The causes of acute gastritis protracted ; a previous long illness ; heredity, resulting in feeble resistance on the part of the child ; irregular and too rapid feeding ; indigestible food ; chronic diseases of the emunctory organs, especially the kidneys, causing chronic congestion of the gastric mucosa.

Pathology.—The mucous membrane of the stomach shows a degeneration of the epithelial lining ; an increase in the secretion of mucus, which is thick and difficult to remove ; its color is dirty gray ; the stomach-wall is usually thickened ; the microscope may show the parenchymatous or the interstitial change most marked according to the stage to which the process has advanced.

Symptoms.—The principal symptoms are indigestion, shown by frequent vomiting of undigested food and mucus ; eructation of gases ; nausea ; colic is often present ; tongue coated with dirty yellow fur ; diarrhea ; disturbed and restless sleep ; irritability ; headache ; stationary weight or a loss may occur ; anemia ; prostration.

Prognosis.—In general it is well if the physician can have complete control of the diet and hygiene of the patient ; the more severe the bowel complication, the worse the prognosis. Recovery is always tardy.

Treatment.—Regulate carefully the diet ; **proper food** includes proper quantity, regularly given, properly prepared. Woollen clothing next to skin in different weights for varying seasons ; daily sponge or tub baths, followed by massage or vigorous rubbing ; removal from present surroundings, from city or town to country. **Lavage** gives the greatest relief ;

using plenty of slightly alkaline water. Wash once in two days at first, unless the quantity of mucus demands it more often. Sodium bicarbonate; hydrochloric acid; nux vomica; pepsin; calomel, and carbolic acid. The most dependence can be placed in lavage, which is an excellent remedy in this condition.

GASTRIC DILATATION.

Synonym.—**Gastrectasia.**

Gastrectasia is **not unusual** in artificially fed children; it may be accompanied with inability of the stomach to propel its contents. An **enlarged** stomach is differentiated from a **dilated** stomach by the above phenomenon.

Etiology,—Overdistention of the stomach from excessive eating or drinking followed by acute fermentation; too frequent eating; continued indigestion; chronic gastritis; rachitis and other diseases of malnutrition; congenital stenosis of the pylorus or stricture from ulceration or inflammatory action.

Pathology.—Degree of dilatation varies greatly; generally uniform dilatation and not sacculated; no constant change microscopically. Muscle-layer may be thinned or hypertrophied; mucous membrane degenerated.

Symptoms.—Chronic indigestion; no special or pathognomonic symptoms; distention of abdomen; wasting of other muscles; sluggish circulation, cold extremities; thirst always present; tongue dry and coated; appetite poor if dilatation and retention great; may be pain on eating or several hours afterward; vomiting or eructation; constipation, small hard movements; scanty and high-colored urine; physical signs of assistance in diagnosis, especially percussion and inflation of stomach.

Prognosis largely dependent on cause, and much better than in adults.

Treatment.—Relieve stagnation by lavage of stomach, using sufficient water to completely cleanse; no antiseptics necessary; wash daily at first, and finally once or twice a week; feed easily digested or predigested foods, in small quantities; limit quantity of liquids ingested; rectal enemas to relieve stomach; careful hygienic care, baths and massage; strychnine in form of nux vomica to children; enemas.

ULCER OF THE STOMACH.

Definition.—In this condition there is a localized death of the tissues, occurring infrequently in children.

Etiology.—Gastritis; tuberculosis; trauma; highly seasoned food.

Pathology.—Usually but one ulcer found; location generally at the pyloric end; at first the edges are smooth—a "punched-out" appearance; in old ulcers edges are indurated. Four varieties as a rule: **ulcers of newly born; ulcers from follicular gastritis; tuberculous ulcers; round perforating ulcers** (Holt).

Symptoms.—Pain in the epigastrium increased at once by eating; tenderness on pressure; hemorrhage and vomiting. Blood may only appear in stools. In the newly born hemorrhage may be the only symptom, or if this does not occur there may be signs of indigestion only. If perforation takes place, the symptoms will be those which occur under similar conditions in the adult.

Prognosis.—In the very young it is very unfavorable. If recovery takes place, stenosis is apt to occur.

Treatment.—Hemorrhage and pain demand active treatment. Keep in bed, rest stomach entirely by enemata of predigested food; ice-bag recommended for hemorrhage, and ice internally with absolute rest; internally give silver nitrate on an empty stomach; opium, codeine, or heroin for pain; large doses of bismuth over long period of time; cerium oxalate for vomiting; occasional doses of calomel for bowels.

PYLORIC STENOSIS.

Definition.—A decrease in the calibre of the pyloric orifice which prevents contents of the stomach passing into the duodenum.

Etiology.—Ulcer; growths in the abdomen which compress the pylorus; displacement of the stomach causing angulation; congenital atresia.

Symptoms.—May not be recognized; vomiting; constipation; dilatation of stomach if of long enough duration.

Treatment.—The only treatment is surgical—a gastro-enterostomy yielding good results. Rectal feeding in the interim.

GASTRODUODENITIS.

Synonyms.—Jaundice; Catarrhal jaundice.

Definition.—An acute inflammation of the stomach and duodenum, with an extension of the inflammatory process into the common bile-duct, an obstruction of its calibre, retention of bile with its resorption, and jaundice.

Etiology.—Those causes which are active in producing gastritis; exposure to cold; improper, irregular, and overfeeding.

Pathology.—An inflammation of the mucous membrane of the pylorus and upper portion of the duodenum extending into the common bile-duct. There are swelling and increased secretion, and because of the occlusion of the bile-duct there is retention of bile.

Focal Symptoms.—Slight discomfort or pain in the right hypochondrium of sudden onset, with nausea, perhaps vomiting, fever, accelerated pulse, and depression.

Systemic Symptoms.—These symptoms are followed in a day or so by a discoloration of the conjunctiva, afterward of the skin of the whole body, reaching a deep yellow in twenty-four hours; the urine shows bile, and the feces are very light in color; anorexia; coated tongue; malaise.

Prognosis.—Good; duration about two weeks.

Treatment.—Heat locally for pain; hot baths followed by brisk rubbing to eliminate bile from skin; calomel, in $\frac{1}{10}$ to $\frac{1}{8}$ grain doses for several days, at two or three hours' intervals; sodium phosphate grains iij to xx according to age, plain or effervescent, three times a day. Patient should drink freely of water.

HEMORRHAGE FROM THE STOMACH.

Synonyms.—Hematemesis; Vomiting of blood.

Etiology.—Difficult labor; hemophilia; ulcer; sepsis; passive congestion from diseases in other organs; malaria, corrosive poisons, and sometimes anemia.

Symptoms.—The only symptoms are the hemorrhage and those which always follow loss of blood. Blood may be red or coffee-ground like; if passed by rectum, it is always digested. May be manifestation of vicarious menstruation. If occurring in nursing baby, should always investigate mother's nipples for fissures or cracks.

Treatment.—Rest in bed; no food by mouth; if loss of blood great, active stimulation.

ACUTE GASTROENTERIC INFECTION.

Synonym.—Acute milk infection.

A common affection especially among artificially fed children or among the breast-fed who are not carefully nursed or with whom the breast milk temporarily disagrees.

Etiology.—It is essentially of bacterial origin, as the name suggests, milk being an exceptionally good culture-medium, and most easily contaminated by carelessness in its first handling. No special organisms isolated, probably the streptococcus and *Bacterium coli commune* at fault.

Symptoms.—Onset generally sudden, vomiting, prostration, normal stools at first, followed by thin undigested movements, green, containing mucus, often in large quantities; frequently offensive; temperature generally quite high; pulse small; prostration may supervene, followed by cessation of symptoms and death in one or two days, or recovery occurs as quickly.

Prognosis in these acute intestinal conditions is always grave, especially in weak and anemic children, and depends largely upon the promptness of treatment; relapses very common.

Dietetic Treatment.—Withhold all milk, and give nothing by mouth in the form of nourishment for twenty-four hours, then dextrinized barley-water in very small quantities. As soon as vomiting ceases and first through and through movement obtained give animal foods, beef-juice, broths with barley-water.

Medicinal Treatment.—If there is much nausea, calomel with sugar of milk, in $\frac{1}{10}$ grain doses every half hour until 1 grain is given; if not much nausea, give oleum ricini in large dose. If calomel can not be retained, use gastric lavage, washing until water returns clear. As soon as the purgative has acted, use colon irrigation with saline solution in large quantities, with soft-rubber catheter No. 18 American scale, suspending the irrigating bag not more than two and a half feet above the patient. Give following prescription when bowels have been emptied:

℞ Bismuthi subnitratis (Merck), ℥ss;
Syrupi rhei aromatici, ʒiij;
Aquæ destillatæ, q. s. ad ℥iij.
(Shake well.)

Sig.—One teaspoonful every two hours—at least 8 doses in twenty-four hours.

Cut off milk until all signs of diarrhea cease, which will not often be necessary much longer than two or three days. Whisky should be given sparingly.

Hygienic treatment is that employed mostly during the stage of convalescence. Proper clothing, band over abdomen for protection; frequent bathing; fresh air and change of climate when improvement is not steady after subsidence of acute symptoms; great care of napkins in young infants.

MECHANICAL OR IRRITATIVE DIARRHEA.

This form of trouble is caused by foreign bodies or food which passed through the tract undigested and acted as an irritatant.

Etiology.—Age—during first two years most susceptible time; unhygienic surroundings; hot weather acts as **predisposing** cause. Among the active causes are unsuitable and uncooked food; foreign bodies; nuts and unripe fruits; overfeeding; drugs; nervous influences; eliminative diarrhea.

Pathology.—There is no inflammation of the mucous membrane, the principal lesions being a hyperemia and an increased peristalsis. If neglected, inflammatory conditions supervene.

Focal Symptoms.—There is an increased frequency of movements which at first contain undigested food, and later mucus with considerable straining. The attack may begin with vomiting.

Systemic Symptoms.—There is but little fever unless autointoxication is present; restlessness and crying from pain and hunger.

Prognosis.—Good, recovery occurring in a few days if properly treated.

Treatment.—Oleum ricini—to sweep out the bowel contents. Calomel is useful, but too slow as a purgative. Purgation should be followed by small doses of opium, of which Dover's powder is the best preparation. Do not give opium in combination with other medicines. Withhold food as long as possible, and resume it with some very simple food which will be wholly digested in the stomach. Nothing is better than the white of 1 egg dissolved in 8 ounces of sterilized water. A few drachms of this should be given at short regular intervals.

CHOLERA INFANTUM.

Definition.—Cholera infantum is a term erroneously applied to other pathologic conditions, and should be used only in connection with the form to be described. It is a rare disease.

Etiology.—No specific organism found; though many varieties are present; cause exists in milk, not found in breast-fed infants. Toxins generated in milk before or after taking cause symptoms. The disease may follow an acute diarrhea, during convalescence; rarely occurs in healthy.

Pathology.—There is practically no constant change to be found in any organs, the intestine showing a washed-out appearance without gross lesions.

Focal Symptoms.—The symptoms are essentially toxic, prostration and high fever rapidly appearing. Sudden and violent vomiting, followed by or associated from the first with diarrhea. The contents of stomach are rejected at first, followed soon by bile and mucus. The stools are very frequent, fecal in character at first, soon losing color, and are entirely serous, as many as twenty or thirty a day, the napkins soaking up the discharges or they may run through. The stools have a musty odor.

Systemic Symptoms.—There is rapid wasting; the skin is pale and transparent, the eyes sunken; the surface temperature is cool, but the body temperature is always high, from 102° to 105° F. The pulse is feeble, rapid, and may be irregular; respirations rapid. The tongue is coated, later dry and red; there is a scaphoid abdomen or **boat-belly**; urine is scanty, there is great thirst, which if satisfied is followed by immediate vomiting.

The fontanelle is depressed, and there are great nervousness, depression, restlessness, and crying—a shrill cry which is suggestive of meningitis.

Prognosis.—This condition is generally of short duration, the patient showing an early improvement or dying in two or three days. Excessively high temperature is of ill omen. Coma preceded by stupor and quieting of the restlessness is grave. Mortality is 60 or 70 per cent. Some children die despite early and most careful and scientific treatment.

Diagnosis.—No other condition in childhood or infancy gives such a train of symptoms: continuous vomiting; purging—many serous stools in twenty-four hours; thirst, hyperpyrexia, prostration, perhaps coma, cyanosis, and death.

Treatment.—Withhold all food; wash out stomach and bowel, using normal saline solution in an attempt to eliminate toxins—not waiting on cathartics; morphine and atropine to neutralize toxic effects on heart and nervous system. As the vomiting is severe, give morphine hypodermatically in dose of $\frac{1}{100}$ grain to child of one year, and repeat for effect. In no internal disease is the indication so clear to supply fluids to take the place of those draining away, and this may best be met by saline intravenous injection or hypodermoclysis. Give baths, beginning with a temperature of 100° F. and gradually cooling to 80° F., for reduction of the temperature; antipyretic drugs not to be relied upon for this purpose. The mustard bath is of great service.

If symptoms abate, feeding should be resumed most cautiously.

ACUTE ENTEROCOLITIS.

Synonyms.—Dysentery; Ileocolitis; Inflammatory diarrhea.

Definition.—A disease in which there are more or less marked changes taking place in the intestinal mucosa, or even the whole intestinal wall.

Etiology.—There nearly always is a history of a preceding attack of indigestion or more or less acute disturbance of the bowels; occurs in early life—generally before five or six years; many organisms are found, especially the *colon bacillus* and *streptococcus*—more frequent in the artificially fed. Overfeeding one of the chief causes.

Pathology.—Both ileum and colon involved as a rule, in a small percentage the colon alone, the process involving chiefly the lower three or four feet of the ileum and the upper part of the colon. In the mild cases, which are referred to as the **acute catarrhal** variety, the changes are not great and occur mostly in the small bowel; the mucous membrane may be injected and swollen and covered with thick mucus. Areas of mucous membrane may be quite injected. In the **ulcerative** form the ulcers are found in the colon—they may involve large areas and may begin in a lymph-node, being limited to a small area around this. In the **follicular** form there are an inflammation, softening and breaking down of the lymph-nodes, mostly found in the small intestine. In the **croupous** form patches of false membrane adhere to the surface of the intestine, involving the lower ileum and the whole colon as a rule. The intestinal wall is thicker than usual, there being a round-cell infiltration of the mucosa and submucosa.

Complications.—Bronchitis, bronchopneumonia, and nephritis.

Symptoms.—In the various forms the clinical symptoms *are practically the same*, but it is impossible to make a diagnosis of the pathologic condition from the symptoms. The movements first contain fecal matter, soon mucus appears, and some blood if there is much straining; blood is generally mixed with the movement. The presence of membrane in the stools is diagnostic of membranous colitis. The temperature is high at first because of a toxic element, later not running so high, 100° to 105° F.; loss of appetite; thirst is excessive; hot weather adds greatly to the patient's discomfort; more or less prostration; loss of appetite; perhaps some pain preceding or occurring with an action; the actions are frequent; and often there is an excoriation of the skin of the buttocks.

Prognosis depends upon the previous history of the child. If it has had frequent attacks of gastro-enteric trouble, the outlook is grave; also if it occurs in weak and anemic children; age is an important factor, young infants bear it poorly; relapses are common and recovery rarely ensues if these are severe.

Treatment.—The promptness with which treatment is instituted influences the course a great deal. The **preventive treatment** is of greatest importance; neglect of apparently slight attacks of indigestion leads to severe enterocolitis. If seen early, the chief treatment is dietetic—*withdraw all milk at once*, and do not resume it until all symptoms have subsided; give no food for ten or twelve hours, and if there is vomiting, no water by the mouth, and early lavage of the stomach, repeated as indicated; if the stomach is not irritable, give a liberal dose of castor oil; if it is vomited, give calomel, in $\frac{1}{10}$ grain doses until $\frac{3}{4}$ to 1 grain has been taken, according to the age of the child. If there are many movements, irrigation of the colon need not be practised, as the drainage is accomplished naturally; but if they are infrequent and contain much mucus, irrigation of the colon is of the greatest service. If the mucus continues in the movements, small doses of castor oil in the form of an emulsion are of great service; this followed in a day or so by bismuth subnitrate (Merck) in 10 grain doses until at least 60 grains are given in twenty-four hours. If the stools are not colored black by oxidation, sulphur in $\frac{1}{2}$ or 1 grain doses may be given with each or alternate doses. (Kerley.)

The diet should consist of foods which are digested in the upper part of the tract, leave but little residue, and form poor culture-media for bacteria in the intestine. Gruels dextrinized with Cereo (barley, rice, oatmeal); the animal broths (beef, veal, mutton, or chicken); whey, with or without wine; egg-water (white of one egg to a pint of water); the concentrated foods, as panopeptone or liquid peptonoids, and later scraped beef.

The resumption of ordinary diet should be very gradual, adding one teaspoonful of milk to a feeding of gruel each day, and its immediate withdrawal if curds are seen in the stools or if they are increased in frequency. If modified milk is used, the proteid percentage should be very low. Predigestion may be tried in extreme cases.

Opium should be administered in this condition very cautiously indeed, and always alone—never in combination. If the stools are very frequent and thin, opium may be given, best in the form of Dover's powder or paregoric.

CHRONIC ENTEROCOLITIS.

This form of intestinal disturbance is a continuation of that condition just described, with a cessation of the acute symptoms.

Pathology.—A catarrhal inflammation of the mucous membrane of the entire gastro-intestinal tract, with sufficient growth of connective tissue to efface the tubular glands. The digestion is greatly impaired.

Focal Symptoms.—There are progressive and rapid emaciation, abnormal bowel actions numbering six or eight in twenty-four hours, mucus in every movement, green and brown in color.

Systemic Symptoms.—There is loss of subcutaneous fat, the skin appears to adhere to the bones, the fontanelle is depressed, the abdomen distended, and the veins of the skin enlarged; flesh of the legs and thighs hangs in folds; the extremities are cold and skin dry and harsh.

Prognosis is universally grave, but especially where the hygienic surroundings are poor without hope of correction, and in the anemic and debilitated from previous ill health.

Treatment is described under **hygienic, dietetic,** and **medicinal.**

Hygienic Treatment.—The child should, if possible, have a change of air, and be out of doors continuously; bathing be regularly and carefully done, and great care exercised in the cleanliness of the napkins and clothing of the child.

Dietetic Treatment.—The diet should be concentrated, nourishing, and at first predigested—that recommended in the preceding chapter; overfeeding should be carefully avoided.

Medicinal Treatment.—Careful cleansing of the canal by an early dose of castor oil is indicated, repeated from time to time as the symptoms arise; opium should be used with great caution; whisky and other alcoholic stimulation used infrequently; astringent irrigations—tannic acid, alum, or nitrate of silver are of service; bismuth in large doses by the mouth is of great service:

℞	Olei ricini,		℥ss;
	Elixir saccharini,		♏xx;
	Olei amygdalæ amaræ,		♏j;
	Olei caryophylli,		♏ij;
	Pulveris acaciæ,		ʒiv;
	Aquæ destillatæ,	q. s. ad	℥ij.

M. et fiat emulsio.
Sig.—Dose, 1 drachm.

CONSTIPATION.

Definition.—Failure to evacuate the bowels daily is constipation—a common condition in childhood.

Etiology.—The conformation of the sigmoid flexure at an early age is a potent factor. After the first few months the colon grows at the expense of the sigmoid flexure, which is freely movable on a comparatively long mesentery. Distention of the intestine from acute fermentation, or lack of muscular control, as in rickets, is a contributing element. The character of the diet is frequently a cause—too little fat being one of the most frequent factors in breast-fed and artificially fed infants. The following are also causes: too little water given breast-fed babies; use of cooked milk over a protracted period; also a deficiency in the natural intestinal secretions.

Symptoms.—In early life, if an infant does not have one stool a day, it may be considered constipated, though the frequency of an infant's stools is a relative term entirely, some children having more frequent evacuations than others. Distention of the intestine occurs from retained gases behind the retained feces; this causes fretfulness, irritability, and pain in younger children; vomiting may occur. If long continued, this condition leads to hemorrhoids from pressure upon the portal circulation and the hemorrhoidal vessels.

Prognosis is very variable as to cure, depending largely upon the cause existing.

Treatment.—*First locate the cause.* If infant is breast-fed, the milk should be examined to ascertain its character, Holt's milk set being of value. If the milk is modified, increase the quantity of fat gradually and diminish the proteids proportionately. Abdominal massage is of great service; frequent enemata to evacuate the sigmoid and rectum; and daily use of a small enema or a small suppository before medication is resorted to. The dextrinized gruels are of assistance in modifying the milk.

Of drugs, the following are of value: rhubarb, cascara in some aromatic preparation, and sodium phosphate.

Regular attempts at evacuation of the bowel are most important, especially in older children, and the early effort to educate the infant by placing it upon a chair or vessel at regular times of the day is an important procedure. **Massage** of the colon is often of assistance, the rubbing being from the right iliac region, following the course of the colon.

COLIC.

This symptom is so **often encountered** in infancy as to need special consideration. Among the laity it is erroneously believed that colic is common to all infants during the first three months.

Etiology.—The direct cause of colic is an accumulation of gases in the bowel causing rapid peristalsis and muscular contraction. The gases are formed from decomposing food, and when present in the breast-fed are almost always due to an excess of proteids in the mother's milk. An excess in the starchy element of the food may contribute to the gas formation.

Symptoms.—When colic is present, there is always pain, which is evidenced by sharp and shrill crying, accompanied by drawing up of the legs; a distended and tense abdomen, in which may be heard the passing of gas through coils of intestine if the ear is put to the abdomen. Heat to the abdomen or the weight of the hand gives temporary relief. Food is taken, generally, whenever offered. The child will fall asleep for a few moments and awake with a start crying.

Diagnosis must be made between **appendicitis, intussusception,** and **acute middle-ear trouble.** From appendicitis the diagnosis is usually rather easy; without the tumor and acute constipation intussusception may generally be ruled out. A careful rectal examination is always needed for a differentiation.

Prognosis is good. In "chronic" or "three months'" colic the symptoms will continue as long as the same food is persisted in.

Treatment consists in that **during an attack** and the **preventive treatment.**

Prevention of Colic.—The child should not be fed too rapidly, should not be overfed nor have a food of too high proteid percentage, and the bowels should be carefully regulated. **During the attack** the treatment is directed toward getting rid of the accumulated gases, which is best done by a purgative, castor oil perhaps the best, and by an enema given high or half-high. To remove the gas from the stomach, hot water or peppermint-water by the mouth, and the other procedures consisting in hot applications to the abdomen. Give as few drugs as possible; no opium in any form.

APPENDICITIS.

Definition.—Appendicitis is an inflammation of the vermiform appendix, and under this term are included all varieties of inflammation occurring in the cecal region.

Etiology.—Because of anatomic peculiarities of the appendix of a child inflammatory conditions of this organ are likely to develop; it is more funnel shaped, is relatively longer, and has a longer mesentery than adults. Its circulation may be interfered with by twisting due to a displacement from distention of the bowel allowing bacterial invasion full sway. The direct cause must be looked upon as of bacterial origin. The commonest organism is the colon bacillus associated with the streptococcus, typhoid bacillus, gas bacillus, and others.

Pathology.—Primary lesion is congestion of the mucous membrane, followed by necrosis and ulceration, with perhaps involvement of the peritoneal covering. This change in the mucous membrane may be coincident with the same changes in the membrane of the intestine. Foreign bodies, composed generally of fecal concretions, potent factor oftentimes.

Peritonitis results, either local or general, if the peritoneum of the appendix is involved.

Prognosis depends upon extent of inflammation, but can never be determined in any individual case, as it varies clinically so materially.

Symptoms.—If only the inner coats of the appendix are involved, the symptoms are not very acute or severe; if all the coats, including the peritoneum, are involved, the symptoms are those in the main of a peritonitis.

In the first named, where inflammation is mostly limited to the inner coats, there are pain, more or less general in a child, referred to the whole abdomen, fever, tenderness without much rigidity. The **pain** may be located in the right iliac fossa by an older child, but not by a young one, who generally complains of a stomach-ache. The **fever** is generally higher in children than in adults, and there may be **vomiting.** There are moaning during sleep and great restlessness, child lying with legs drawn up. Any severe pain in the abdomen must be looked on with suspicion, and the case watched minutely. **Rigidity** of the abdominal muscle of the right side is always present in perforation, and usually for a short time before. A tumor may be felt if an abscess has formed and localized. Marked **leucocytosis** may aid diagnosis.

Diagnosis must be made from **pneumonia, pleurisy, internal strangulations of the bowel,** especially **cecal intussusception,** and may be very difficult.

Treatment.—The crucial point for consideration is the indication for operation. Richardson states that the appendix should be removed in (1) all severe cases seen early, unless there are contraindications to operation in other organs or in the patient's general condition; (2) in all severe cases which when first seen are at a standstill or are increasing in severity; (3) in all severe cases unless they are unmistakably improving; (4) in all cases in which the symptoms are well marked and well localized; (5) in those cases in which the disease is limited to the appendix itself and it is presumably certain the abdomen can be closed without drainage.[1]

In a child the indications for removal of the appendix early are even greater than in an adult. Pus when formed should be evacuated thoroughly, and if the patient is able to withstand the prolonged anesthesia the appendix stump should be removed at the same time.

The case should be watched from the first by both the physician and the surgeon.

Food by the mouth must be cut off entirely, and the patient sustained by predigested rectal enemata. Recurrent cases should have the appendix removed in the interval.

INTESTINAL OBSTRUCTION.

Causes and Varieties.—This condition is **occasionally seen** in the newborn, and unless due to an imperforate anus or imperforate rectum, is generally of mechanical origin, as **intussusception; foreign bodies,** a mass of worms coiled in one place, articles swallowed; a **volvulus**, or a twist of the bowel on itself; a **band** of **adhesions** constricting the lumen; a **strangulated** hernia.

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[1] Park's Surgery.

Symptoms are gradual in onset if from a growth, but sudden if due to a twist or strangulation from any cause. There is vomiting, with inability to have an evacuation. The intestines soon fill with gas, the vomiting becomes stercoraceous, collapse ensues, and death follows shortly.

Treatment is entirely surgical. If diagnosis is made early before collapse has occurred, surgery may be of avail. If only an exploratory incision is made for diagnostic purposes, the obstruction not found, and the patient in a precarious condition, an artificial anus should be made and the patient's life saved.

INTUSSUSCEPTION.

Definition.—This is an obstruction of the bowel due to an invagination, one portion of it passing into another.

In about 30 per cent. of cases the obstruction is located at the ileocecal valve, the small intestine being invaginated in the large. Numerous invaginations have been reported as occurring in the same patient.

Etiology.—Boys seem oftener subjects of this trouble than girls; intestinal disorders, indigestion, inflammation, etc.; violent exertion; colic, etc.

Pathology.—Invagination is generally from above downward. There are three layers of bowel: the part which is invaginated is called the **intussusceptum**, the receiving portion the **intussuscipiens.** From venous engorgement due to the constriction the intussusceptum is so swollen as to prevent its reduction and a sloughing of the intussuscipiens results from pressure; adhesions soon form rendering reduction impossible.

Symptoms.—The **onset** is sudden; the **pain** very great, caused by pressure and by dragging on the mesentery. The essential symptoms are **pain, vomiting, distention** of the abdomen, **collapse,** and the **passage of blood and mucus** from the rectum, without fecal matter. The vomiting soon becomes stercoraceous, showing that complete obstruction exists. If the abdominal walls are thin and distention not too great, a tumor may be distinctly felt; a tumor may be felt through the rectum.

Treatment.—Spontaneous recovery by sloughing and elimination of the intussusceptum has been recorded. The longer operation is delayed, the greater the mortality. The treatment may be **palliative** or **operative.** The former includes **abdominal massage**; **injections** of gas, air, or water with the patient inverted. These methods may be successful only quite early in the attack, and should be attempted for only a time and with great caution. Delay in operating means death as a rule.

Operation consists in reduction by traction or preferably by manipulation, which is practically impossible if case has existed any length of time; in resection and suture, and in the formation of an artificial anus.

QUESTIONS.

What is herpes? Give its treatment.

Define perlèche. What is its treatment?

How may eczema of the lips be recognized? What is the treatment?

Describe epithelial desquamation of the tongue.

Describe glossitis, and give its symptoms and treatment.

What is a stomatitis? Name and describe the clinical varieties. How is it treated?

Name the synonyms of thrush. What organism is the cause?

Describe a typical case. What are the symptoms? How is it treated?

Describe gingivitis, and give the treatment.

Describe gonorrheal and syphilitic stomatitis, and give the treatment.

What is ranula? Give the treatment.

Define and give symptoms of alveolar abscess. How is it treated?

Discuss the cause, pathology, and symptoms of acute pharyngitis. Give the treatment.

Why are the symptoms and treatment of elongated uvula.

What is a peritonsillar abscess? Name the synonyms.

What are the lesions? Give the symptoms and treatment.

Describe retropharyngeal abscess. How is it caused?

What are the symptoms and treatment?

What precautions in operating should be observed?

What symptoms may be present in a child having swallowed a foreign body? How should it be treated?

Discuss acute esophagitis, its cause, symptoms, and treatment.

Discuss fistula of the neck and state its cause.

In what respect does infant digestion differ from that of adults? What may be said in regard to the bacteria of the stomach and intestines?

How are gastric disorders classed?

What is gastralgia? How is it treated?

What is cyclic vomiting? Describe its etiology, diagnosis, symptoms, and treatment.

Give the etiology, pathology, and symptoms of acute gastritis? What is the prognosis, and in what may the affection terminate? Give the treatment.

What are the etiology and pathology of chronic gastritis? How diagnosed? Give the treatment.

Describe ulcer of the stomach. What are the symptoms? Give treatment.

Discuss pyloric stenosis in all its phases.

What is catarrhal jaundice? How is it produced?

What are the pathologic changes?

Give the symptoms and treatment.

In what conditions does hemorrhage from the stomach occur? How recognized? Give treatment.

What is the cause of mechanical or irritative diarrhea? What pathologic changes are present?

Define cholera infantum. Give its pathology.

What focal symptoms are present?

Give the systemic symptoms, prognosis, and diagnosis. Give the treatment.

What are the synonyms for acute enterocolitis? What are the causes?

Describe the pathologic forms? What are the symptoms and prognosis?

What is the medicinal and dietetic treatment.

Discuss the various phases of chronic enterocolitis, giving the symptoms, prognosis, and treatment.

What are the essential causes of constipation? How are they treated?

What is colic and how is it diagnosed? What are the causes, symptoms, and treatment?

What may cause intestinal obstruction?

What symptoms are present? How is it treated?

What is gangrenous stomatitis? Name the synonyms.

Give the etiology and pathology.

What are the symptoms and prognosis? How should it be treated?

Give the clinical forms of tonsillitis.

Discuss acute follicular tonsillitis in all its phases. What is the treatment?

Describe chronic tonsillitis. What is frequently associated with this form?

Describe the surgical treatment.

What internal treatment is indicated?

Give the etiology and pathology of acute indigestion.

What are the symptoms, and how is it differentiated from other diseases?

Give the medicinal and dietetic treatment.

Describe gastric lavage.

What is gastrectasia, and how is it caused?

What is the pathologic condition of the stomach?

Give the symptoms and treatment.

What is acute milk infection? How is it produced?

What are the symptoms and prognosis?

Give the dietetic, medicinal, and hygienic treatment in detail.

Define appendicitis. What are the causes, direct and contributing?

What is the pathology? Give the symptoms of an acute attack.

What may cause intestinal obstruction? Give symptoms and treatment.

What are the indications for treatment?

What is an intussusception? How is it produced?

How are the various parts of the tumor named?

What are the symptoms and how may it be treated?

CHAPTER XII.

INTESTINAL PARASITES.

Significance.—The possibility of trouble being caused by the presence of intestinal parasites in the alimentary canal is deeply rooted in the mind of the laity, and for this reason, if for no other, the subject is of great importance.

Varieties.—Of the parasites which are found in children, the following are the most frequent: the pin-worm, **Oxyuris vermicularis**; the round worm, **Ascaris lumbricoides**; and the two species of tapeworm, the beef-worm, **Tænia mediocanellata**, and the pork-worm, **Tænia solium**

Each will be considered separately, as each has a different life-history.

ASCARIS LUMBRICOIDES.

Synonym.—Round worm.

Form.—As its common name suggests, this worm is entirely cylindric, and from 4 to 10 inches in length, pointed at both ends. The sexes are distinguished by the greater length of the female and the curved posterior extremity of the male. The eggs are produced in great number by the female, and pass out of the intestine; being reingested by the same or other patients may develop into worms in the intestine. The eggs are $\frac{1}{400}$ inch long, oval shaped, have thick coats and granular contents. They are found in the stomach, not infrequently being vomited up, and may penetrate the bile-duct or even the intestine into the free cavity of the abdomen.

Symptoms.—If the round worm is not found elsewhere than in the small intestine, no symptoms are generally present, even if they are found in large numbers. They thrive upon the juices of the intestine and do not demand extra nourishment from the child. Generally the first symptom noted is the presence of the worm in the stool, and those symptoms generally credited to the worm may be accounted for entirely by other pathologic conditions present. The symptoms generally supposed by the laity to be indicative of worms are picking at the nose, flatulence, restlessness, abdominal pain or discomfort, headache, fever; irregular bowel movements, perhaps with mucus present; grinding of the teeth. The worms are often found in the stool during an attack of fever from other causes. The author has a record of a child who passed eighty-eight by the bowel and vomited two while ill with malaria, no anthelmintic having been given.

Diagnosis has already been referred to, the only positive indication being the finding of the ova in the discharges or the worm itself.

Treatment.—Santonin is an excellent remedy, and may be given in the following form (rubbing it up thoroughly with milk-sugar) (*for a child of two years*):

℞	Santonin,	gr. ij;
	Sacchari lactis,	gr. xx.

Ft. capsulæ aut chartæ No. X.

Calomel may be combined with this in small doses.

Among the other remedies suggested are spigelia and oil of chenopodium; neither is as efficient as santonin. Santonin is occasionally poisonous, and indicates, therefore, the habitual combination with a cathartic like calomel or the administration of a cathartic during the first few hours of the treatment.

OXYURIS VERMICULARIS.

Synonyms.—Pin-worm; Thread-worm; Seat-worm.

Habitat.—This worm is found in the colon, the rectum, and in the lower ileum, the eggs not developing until the lower ileum is reached. In girls the worms may migrate into the vagina after escaping from the rectum. The female worm is from $\frac{1}{4}$ to $\frac{1}{2}$ inch in length, the male about a third as large. Reinfection occurs from the child scratching the anus infecting its fingers, and the eggs are thus conveyed to the mouth. Toys are also similarly infected.

Symptoms.—The chief symptom of oxyuris is the intense itching about the anus, which causes scratching and restlessness, with many nervous symptoms frequently. Reflex convulsions have been attributed to this irritation. Incontinence of urine may be caused by the oxyuris, and vulvovaginitis is a frequent occurrence.

Diagnosis.—As in the other varieties of worms, the chief diagnostic point is the presence of the worm or the ova. Large numbers of the worms, covered with mucus, may be brought away by an enema. In cases of masturbation, vulvovaginitis, or eczema about the nates, oxyuris should be suspected.

Treatment.—To be effectual, the treatment must expel all the worms, and this may be accomplished only by attacking them from both ends of the alimentary tract. The anthelmintics mentioned above may be used with effect, with cathartics, to produce watery evacuations, salines being best, as follows:

℞	Magnesii sulphatis,	℥iv;
	Syrupi rubi idæi,	f℥ij.

M.

Sig.—A tablespoonful at a dose. (Townsend.)

In connection with this should be used enemata of **quassia**, with a soft-rubber catheter or small rectal tube, cool saline solution first washing away the worms, the quassia destroying the ova. Soap and water, quinine, tannic acid, and alum have been recommended.

It must be remembered that the presence of the ova on the skin about the anus is a constant menace, and unless some remedies be used to destroy them there may be a reinfection. Boric acid in ointment form is effectual:

℞	Acidi boracici (pulveris),	gr. xij;
	Unguenti aqua rosæ,	℥ij.

M. et ft. unguentum.

Sig.—Rub well twice daily after thorough washing.

The napkins, clothing, and bed-clothing, if soiled, should be thoroughly boiled.

TÆNIA.

Synonym.—Tapeworm.

Form.—The tapeworm varies in length from 20 to 40 feet. The essential parts of the worm are flattened segments, and the head, which is about the size of a pin-head, containing suckers which grasp the intestine wall. Unless the head is evacuated cure is not complete. The beef tapeworm, **Tænia mediocanellata**, and the pork tapeworm, **Tænia solium**, are the commonest varieties. The two varieties may be distinguished by characteristics found on the head. Their habitat is in the small intestine.

Symptoms.—The only symptom present which is trustworthy is the presence of a segment of the worm in the evacuations. The bowels may be irregular, and nausea and vomiting may be present. One may be the host of a worm for years without any symptoms being present.

Treatment must be vigorous and carefully administered. The patient should be starved for a number of hours in order to weaken the hold of the worm—a very light dinner, cup of broth for supper, no breakfast, and the anthelmintic administered during the early forenoon, followed in an hour by a cathartic. Among the anthelmintics may be mentioned pomegranate or its alkaloid pelletierine; filix mas; kousso; turpentine, and pumpkin seed.

The objection to pelletierine, one of the most efficient, is its expense, an ordinary dose being costly. The following is an agreeable preparation :

℞ Oleoresinæ aspidii, ℥j ;
Tincturæ quillaiæ, f℥ss ;
Syrupi aurantii dulcis, f℥j ;
Syrupi aurantii, q. s. ad f℥vij. (Townsend.)
M. et Sig.—Take in two doses.

All the anthelmintics should be followed by a large dose of cathartic—oleum ricini being one of the most efficient—within two or three hours after administering.

QUESTIONS.

What are the common and scientific names for the intestinal parasites?
What are the physical characteristics of Ascaris lumbricoides?
What symptoms are produced by their presence?
Describe Oxyuris vermicularis.
Where is its habitat?
What symptoms are produced? How diagnosed and treated?
What are the varieties of tapeworm? What are their names?
Give the characteristics of each.
What symptoms are present?
What treatment is effectual?

CHAPTER XIII.

DISEASES OF THE RECTUM AND ANUS.

PRURITUS ANI.

Definition.—This is an itching of the skin about the anus of greater or less severity, and frequently seen in children.

Etiology.—Vulvovaginitis, thread-worms, pediculi infrequently encountered in children, a colitis with irritating discharges of an acid mucus, or an eczematous condition of the skin.

Symptoms.—There is intense itching about the anus and the surrounding integument. The skin soon becomes slightly thickened and reddened, showing the scars produced by the nails in scratching. The pain from this is a relief in comparison to the itching. There are loss of sleep and restlessness, anorexia, and irritability of temper.

Treatment.—Remove the cause; absolute cleanliness, especially after a movement; and keep the parts covered and protected from the air by a powder which is impervious to water, as **zinc stearate** or the following, or a similar ointment:

℞ Mentholis,	gr. x;
Acidi carbolici,	♏x;
Unguenti zinci oxidi benzoat.,	
Vaselini,	āā ℥ss.

M. et ft. unguentum.
S.—After each movement and at night.

PROLAPSE OF THE RECTUM.

Definition.—This may be a simple prolapse of the mucous membrane or a prolapse of all the coats of the bowel, or an invagination may also exist.

Etiology.—This is a fairly common condition in childhood predisposed by the loose attachment of the connective tissue about the rectum, and the straight posterior wall of the pelvis. Other causes are: allowing children to sit for a long while upon a chair or vessel; chronic colitis.

Symptoms.—There is a protrusion of the bowel during or after defecation, which is covered with mucus. The condition may be confused with hemorrhoids, but when reduced no tumor is found as is present in hemorrhoids as well as in rectal polypi, with which it may be confused.

Treatment.—The mass should be returned as soon as possible after its protrusion, which is accomplished by anointing and pressure with the tips of three fingers. The bowels should not be allowed to move with the patient in the upright position, but lying down, the movement assisted by the administration of an enema, and the perineum should be supported by pressure as the feces are extruded. The curative treatment consists in astringent injections (tannic acid, oak-bark decoction, alum solution, and cold saline solution), or a cautery is applied, either the actual cautery in linear strokes, or the surface is painted with nitric acid—these procedures being done under general anæsthesia.

The patient should wear a perineal bandage to which is attached a pad immediately over the anus.

HEMORRHOIDS.

Synonym.—Piles.

This condition is very **uncommon** in children. The **pathology** is essentially the same as in the adult.

Varieties.—Internal hemorrhoids are much more infrequent than the external variety. If of the external variety alone, there is no bleeding during defecation. Chronic constipation *is the most* frequent **cause.**

Treatment.—Careful regulation of the bowels, careful feeding, and the application of an astringent ointment after thorough cleansing with cold water, are generally sufficient. Operation by the clamp and cautery or a ligature may be required—but rarely.

POLYPUS OF THE RECTUM.

Definition.—This condition is not an unusual occurrence in childhood. It consists in a tumor of more or less size attached to the rectal wall, one or two inches from the anus, by a pedicle much smaller than the tumor.

Pathology.—The tumor is of the follicular or adenoid type, much like the adenoid masses growing in the pharynx of strumous children. They may bleed if extruded outside of the sphincter and strangulated. The pedicles may be 2 or 3 inches in length or much shorter.

Symptoms.—There is generally great straining at stool, prolonged for some time after defecation is completed. This is generally followed by a discharge of blood and mucus. The diagnosis may readily be made by the introduction of the finger and making careful digital exploration.

Treatment.—Under general anesthesia the anus is sufficiently stretched to expose the polyp—it is pulled down and a ligature applied around the pedicle close to its attachment, and the polyp cut off close to the ligature. If several polpi are present, this is done to each one separately. It is unsafe, because of the danger of hemorrhage, to twist them off without a ligature. Many operators cauterize the stump lightly as an additional precaution against hemorrhage.

ISCHIORECTAL ABSCESS.

Definition.—In this condition there is a collection of pus in the loose connective tissue about the rectum in its lower portion.

Etiology.—Injuries to the rectum or nearby area ; an infection may occur through the wall of the rectum by the bloodvessels or the lymphatics.

Symptoms.—Pain or sense of weight and fulness in the rectum; great tenderness; pain on walking, greatly increased on defecation; fever. Examination externally shows a tense tumor beside the rectum near the tuberosity of the ischium, which is not very tender to pressure. If a rectal examination is not too painful, the wall next the abscess is felt to protrude.

Treatment.—Free incision immediately pus is formed is most important, as fistula in ano is a common result if neglected. Under general anesthesia the abscess is incised freely, the opening enlarged with forceps or the finger, pockets broken up, the cavity freely irrigated with an antiseptic solution and packed snugly with plain sterile gauze.

FISTULA IN ANO.

Definition.—This condition results from an ischiorectal abscess, and consists in a sinus leading from the rectum to the skin or ending in the abscess cavity. Sometimes fistula in ano begins on the skin and may then pass into the rectum or end in an abscess cavity.

Symptoms.—There is no pain; if there is a discharge of pus from the rectum, and internal fistula should be suspected, examination will show an opening in the rectum or on the surface near the anus. Protracted cases are suggestive of tuberculosis.

Treatment.—This may only be accomplished under general anesthesia. A grooved director should be passed through the external—or the internal opening if an external does not exist—and brought out at the anus, the intervening tissue being divided by scissors or knife. Careful search should be made for pockets with the director and the tissue above carefully divided, and the whole wound packed with gauze to insure healing from below by granulation.

FISSURE OF THE ANUS.

Synonym.—Irritable ulcer.

Definition.—A fissure of the anus is a small ulcer which exists in one of the radiating folds of the skin of the anus. It occurs quite frequently in children.

Etiology.—The passage of large formed fecal masses causes a rent of the skin at this point and a small ulcer results, or the same condition may result from irritation due to scratching or to an external injury.

Symptoms.—Practically the only symptom is severe pain on defecation, and on partially distending the anus and obliterating a fold of the rectum the ulcer is exposed; blood may be passed also.

Treatment.—Gradual divulsion of the anus may be accomplished by introducing the anointed finger into the anus—finally the thumb. No anesthetic is needed. The ulcer may be touched with silver nitrate, covering afterward with the following ointment:

℞ Iodoformi,
Aristoli, āā gr. xxx;
Vaselini, q. s. ad ℥j.
M. et ft. unguentum. (Wharton.)
Sig.—Apply locally.

QUESTIONS.

What is pruritus ani, and how is it caused?
What symptoms are produced? How is it best treated?
What produces a prolapse of the rectum?
What are the symptoms and how are they treated?
Describe hemorrhoids, and give the treatment.
Give the pathology and symptoms of rectal polyp.
What is the treatment?
How is ischiorectal abscess produced?
What are the symptoms?
What is the treatment?
Into what does it frequently eventuate?
What is a fissure of the anus?
Discuss the etiology, symptoms, and treatment.
Define fistula in ano.
Give the symptoms and treatment.

CHAPTER XIV.

DISEASES OF THE LIVER.

Because of the anatomic distribution of the fetal blood-vessels, the liver receives the first supply of arterial blood from the placenta, and at birth the liver is larger and heavier than any other organ. The free border of the liver is felt below the border of the ribs and extending beyond the median line to the left hypochondrium. Diseases of the liver in infancy and childhood are comparatively rare, and pathologically are very similar to those conditions found in adults.

ICTERUS.

Synonym.—Catarrhal jaundice.

Catarrhal jaundice is not infrequently found in children, being more often seen after three years of age.

Etiology.—Catarrhal inflammation of the bile-ducts, causing a swelling and obstruction to the lumen. Contributing causes are exposure; indigestion from errors in diet.

Systemic Symptoms.—The principal symptom is discoloration of the skin and conjunctiva from deposition of the biliary coloring-matter; may be preceded by gastric symptoms—nausea and vomiting, loss of appetite, malaise, headache, perhaps pain in the right hypochondrium.

Focal Symptoms.—The discoloration may vary from a pale yellow to a very deep tint. The stools are white—"clay-colored" and frequently offensive; the urine is high colored and diminished in quantity. The child is drowsy and inclined to sleep a great deal. Itching of the skin is often present from irritation by the bile-pigment. The liver may be slightly enlarged and tender over the region of the gall-bladder.

Treatment.—As preliminary treatment calomel should be administered in small doses, followed by sodium phosphate (either plain or effervescent form), with quantities of water. The diet should be as free from fats as possible, skimmed milk or whey, but little or no meats, and no sugars. Acidulated drinks can be given.

CIRRHOSIS OF THE LIVER.

Definition.—This is not an infrequent condition in childhood, and alcohol is one of the most frequent causes. Malaria is a common cause, also syphilis, and it occurs as a sequela of the exanthemata.

Pathology.—Two types are encountered, the **atrophic** and the **hypertrophic** form ; in the latter form, which is often most encountered in children, the cells do not atrophy and there is not so much contraction of the fibrous tissue.

The liver is yellow and firm ; on section the new fibrous tissue is seen to follow the branches of the bile-ducts.

Symptoms.—The early symptoms are those which would arise from a condition of passive congestion of the stomach and intestines. There are loss of weight, and generally an early accumulation of ascitic fluid, vomiting, later vomiting of blood, hemorrhoids. enlarged veins of the skin ; diarrhea may occur, with bloody discharges occasionally.

Prognosis is quite unfavorable, but is influenced somewhat by the time at which treatment is begun.

Treatment.—Remove the cause if this can be ascertained. Keep the patient as long as possible on a milk-diet, which is beneficial, acting, as it does, as a diuretic also. Calomel is indispensable ; it should be given in small doses over a considerable period of time, acting as a diuretic, stimulant to the contracting hepatic cells, and limiting the amount of new-tissue growth.

Ammonium muriate has been recommended as a beneficial agent. If ascites is present to a marked degree, **paracentesis abdominis** can be done.

AMYLOID DEGENERATION OF THE LIVER.

Causes.—Rarely occurs **de novo**, but as an associated condition in syphilis and suppurating conditions in other parts of the body, as tuberculous degeneration of bones and glands, empyema, etc. The kidneys and spleen frequently undergo a like degeneration.

Pathology is the same as in the adult liver which has undergone a similar degeneration. The liver is large and its surface smooth. The process begins in the capillaries and extends to the liver-cells.

Symptoms.—No clinical symptoms are presented as characteristic. A large liver without special symptoms is always suggestive of this condition. There may be an enlargement of the spleen also from a similar change. The nutrition is decidedly impaired if the condition exists very long.

Treatment.—Practically nothing can be gained by treatment. If the cause is removed, this condition will be improved.

SUPPURATIVE HEPATITIS.

Synonym.—Abscess of the liver.

The **history** and **pathology** of this condition are practically the same as when encountered in the adult, though it is quite infrequent in children. There may be two varieties, a single abscess or numerous foci of suppuration.

Etiology.—Metastasis; acute infectious conditions of the gastro-intestinal tract; trauma.

Symptoms.—These vary according to the point involved; if localized, the symptoms are less urgent; the pain is great if it is near the surface. If the process is more or less diffuse, the liver is enlarged and tender; fever and chills often occur.

Diagnosis is not always easily made. A liver which is large and painful with an irregular temperature, sweats, and rapid pulse gives an association of symptoms which are suggestive.

Treatment is purely surgical, combined with a combating of the effect on the general system by tonics and stimulation.

GALL-STONES.

Synonym.—Biliary calculi.

A comparatively infrequent condition in childhood; yet they do occur, and are often not diagnosed.

Etiology.—It is believed the role of bacteria in the causation of gall-stones is considerable, causing a precipitation of the bile solids, which, with the exfoliated epithelium as a nucleus, forms the gall-stone. The stones may be single or multiple, and are generally quite small, located usually in the gall-bladder. There is as a rule a coincident cholecystitis.

Symptoms.—Gall-stone colic is generally present, which may be due to nature's effort to pass a small stone or a piece of inspissated bile or mucus through the gall-ducts. Pain of this character is generally easily localized in children; it is sudden of onset, very acute, causing continuous crying. It may be associated with acute gastric symptoms, vomiting and retching, with symptoms of prostration, cold skin, pallor; this may be followed by temperature if there is much inflammatory condition about the gall-bladder or ducts. Jaundice, while by no means a constant symptom, is very often present from obstruction, occurring on the second or third day. There may be considerable tenderness over the gall-bladder, which may be found distended. Impaction of the stone in the common duct invariably causes jaundice; if in the cystic duct, the gall-bladder becomes enlarged and painful much more quickly, and if the obstruction is complete and much inflammation is present, suppuration may occur.

Treatment.—Morphine is indicated for the relief of pain if this cannot be alleviated by local application of heat, sinapisms, or a hot bath. The dietetic treatment for the prevention of the re-formation of stones is indicated, fats and sugar contributing to their formation.

Sodium phosphate is a drug of great value, with occasional doses of calomel. Olive oil has been advised. The surgical treatment offers great advantages, with removal of the stones and free drainage of the bladder, which relieves the inflammation and causes the bladder to contract to its normal size.

DISEASES OF THE SPLEEN.

The spleen may be the seat of disease, independently of other organs, but it is most frequently enlarged as the result of constitutional disturbances. Holt gives the weight of the spleen at birth as ¼ ounce, at twelve months of age ¾ ounce, and at two years of age 1¼ ounces. In attempting to ascertain whether the spleen is enlarged, percussion is of no assistance; it may be demonstrated by palpation. If the spleen may be felt easily below the free border of the ribs, through the flaccid abdominal muscles, it is surely enlarged. The spleen may be enormously enlarged, so as to be found well down in the abdominal cavity. Its normal location is under and against the diaphragm extending along the ninth, tenth, and eleventh ribs.

ENLARGEMENT OF THE SPLEEN.

Enlargement of the spleen may be caused by malaria, typhoid fever, rickets, syphilis, tuberculosis; the various blood diseases, as leukemia and Hodgkin's disease; and new growths, as sarcoma.

Treatment depends entirely upon the cause of the condition.

DISEASES OF THE PERITONEUM.

ACUTE PERITONITIS.

Occurrence.—Acute peritonitis **de novo** is a rare condition, occurring as a complication of typhoid fever, appendicitis, etc. It may be local or general, it being rare for a peritonitis to remain local very long.

Etiology.—Early in life peritonitis may be caused by an infection through the umbilicus, the extension of the process being chiefly by means of the vessels. Appendicitis, intussusception, strangulated hernia, traumatism, exposure, perforation of the intestine and stomach from ulceration, extension from a cholecystitis, psoas abscess from spinal caries, nephritis—in all of these conditions the pus-producing organisms being found, among the most frequent being the *colon bacillus, streptococcus* and *staphylococcus; Diplococcus pneumoniæ* is sometimes found.

Pathology.—The normal shiny appearance of the peritoneum *gives place to* a dull surface, with deep injection of the surface from enlargement of the small capillaries; some fluid may be thrown out, the extravasation may be serofibrinous or pus, which is found adhering to the peritoneum. If the condition lasts some time, the opposing surfaces become adherent, the adhesions being more or less dense, and if recovery occurs they become organized. In conditions following appendicitis, for instance, these adhesions often limit the pus distribution by forming a wall.

Symptoms.—The position assumed by the patient is dorsal, with legs and thighs drawn up to prevent tension on the abdominal muscles; pain is intense, coughing or a deep inspiration causing great suffering; weight of the bedclothes is often complained of. The diaphragm is little used in breathing. Paresis of the intestinal walls ensues with rapid distention of the abdomen, constipation resulting, with an early onset of vomiting, which follows drinking of water or occurs without ingestion of anything. The tongue is more or less dry and red, generally free from coating, or with a very fine white fur. The urine is scanty, and may be retained because of the pain caused by voiding.

The temperature is usually high, but follows no regular curve. The pulse is rapid, wiry, and of little volume.

Prognosis is always grave in this condition, death occurring in the largest percentage of cases. Some cases, however, apparently very unpromising do recover.

Treatment.—Surgery gives promise of the best results if the case is seen sufficiently early and the diagnosis of the cause may be made at this time. In justice to the patient the care of the case should be assumed jointly by the physician and the surgeon.

Internal treatment is only palliative, saline and opium having their advocates; local application of ice over the abdomen, or heat if more grateful, is always indicated. Only very little and the most easily digested food should be administered, preferably predigested. The extreme distention may be relieved to a certain extent by introduction of the rectal tube.

TUBERCULOUS PERITONITIS.

Synonym.—Tuberculosis of the peritoneum.

Definition.—Tuberculous peritonitis is the most common form of peritonitis in children, occurring most frequently between the ages of seven and ten years. It is generally secondary to tuberculosis of some other region, infection occurring through the blood or the lymphatics.

Pathology.—Numerous small tubercles—**miliary**—are found studding the peritoneum covering the intestines, or there may be broken, **caseating** glands as the beginning of the process. There is generally an associated ascites of greater or less amount, and if fluid is not present there are usually a number of adhesions.

Symptoms.—These are varied according to the clinical type presented, the ascitic form; that with adhesions alone, and where there is a caseation of the glands and ulceration, the systemic form. In the **ascitic** form perhaps the first symptom will be the rapid formation of fluid in the peritoneum, following usually upon a period of malnutrition and wasting. An irregular fever is generally present, without following any special curve.

Local Symptoms.—Colicky pains are often present, with irregular bowels—diarrhœa alternating with constipation, with rapidly increasing emaciation. This is probably the most favorable form as recovery not infrequently occurs.

Systemic Symptoms.—In the **ulcerative** form there are a caseation and final breaking down of tuberculous glands and distribution of pus over the peritoneum. This causes an adhesive inflammation of the peritoneum covering the intestines.

Locally the abdomen is tender, swollen, and if examination is permitted nodules may be detected through the abdominal wall. There are no symptoms specially indicative of this form unless it be the very tender abdomen and the distinctive feel of the nodules through the wall.

Diagnosis.—This is usually easy where there is progressive wasting with rapidly forming ascites, and a slight irregular rise of temperature.

Prognosis is favorable, particularly in the ascitic varieties.

Surgical treatment offers the best results in this condition, by incision and drainage, less so in the adhesive form than the ascitic form.

The **general treatment** is that of tuberculosis of any other variety, rich nourishing food, tonics, codliver oil, etc.

QUESTIONS.

What anatomical peculiarities exist in the infant's liver?

What is catarrhal jaundice? How caused?

What are the symptoms and treatment?

What is cirrhosis of the liver?

Give the etiology and pathology, symptoms and prognosis. How treated?

Define and describe amyloid degeneration of the liver and suppurative hepatitis. Give the treatment of each.

What are the causes of gall-stones? Give the symptoms of gall-stone colic.

How is the condition of lithiasis recognized? Give treatment.

Describe the spleen, its size, location, and method of examination.

What causes its enlargement?

What diseases of the peritoneum are encountered?

What are the causes of acute peritonitis? What role do micro-organisms play in the etiology?

Give symptoms and treatment.

What are the lesions in tuberculous peritonitis? How many clinical varieties?

What symptoms present?

Give the diagnosis, prognosis, and treatment.

CHAPTER XV.

GENERAL DISEASES.

DIABETES MELLITUS.

Definition.—As in the adult, this is a disease characterized by the passage of a large quantity of urine charged with sugar, and while a quite uncommon condition in children it is rapidly fatal in the majority of cases. It is more frequently seen in girls than in boys.

But little is known of the **pathology** other than theoretically.

Symptoms.—Frequent urination with a great increase in the quantity; thirst; increased appetite, but rapid and progressive emaciation. The urine is clear, specific gravity higher than normal, contains sugar; may contain albumin. Furunculosis usually occurs. Progress is rapid; death usually occurs in less than a year. Coma is generally present at the time of death.

Diagnosis is not usually made early because urinalysis is so infrequently resorted to by clinicians in children's diseases. Examination of the urine shows sugar in greater or less amount; a quantitative analysis is absolutely necessary to the proper knowledge of the progress of a case of diabetes.

Treatment is not of great avail; limit the carbohydrates, giving meat, milk, eggs; bathing; fresh air, and carefully gauged exercise. Of the drugs recommended, codeine gives excellent results; opium and arsenic in some of its forms may be of service. Benzosol in 3 to 5 grain doses is recommended.

RHEUMATISM.

Synonym.—Rheumatic fever.

Definition.—An acute inflammatory disease affecting the serous and fibrous tissues, especially those of the joints.

Etiology is not known, but there are several predisposing causes, the most prominent being hereditary tendency. It is precipitated frequently by exposure and fatigue.

Pathology.—There is congestion of the inflamed membrane wherever affected, with an effusion, frequently of serum, if the joint is affected.

Symptoms.—The initial symptom is generally a chill or a rigor, with languor and lassitude developing quickly; this is followed shortly by pain in the joints, swelling, heat and redness, elevation of temperature to 102° F., with a very active skin. If the fever is high, there may be delirium. In some cases, especially those in which the joints are not seriously affected, the patient may not feel sick enough to go to bed, but it is in those cases a crippled heart is most frequently encountered. The knees, ankles, wrists, and elbow-joints are most frequently affected, though but one joint may show signs of inflammation.

The **heart** is much more often affected in children than in adults, both the pericardium and endocardium being involved, more frequently the endocardium. Every case of joint-pain, no matter how localized or slight, demands a full examination of the heart, as a severe endocarditis may occur with comparatively no subjective heart-symptoms, and be entirely unrecognized. If a pericarditis exists, there may be some pain, but usually there is none beyond a slight distress in breathing. The heart may be irregular and the pulse of less volume. Physical examination of the heart is essential to a diagnosis of the true condition.

Complications.—**Chorea** is closely allied to rheumatism.

Acute tonsillitis may occur during the course of acute rheumatism or follow it; or it may be the only manifestation of an attack. **Subcutaneous nodules** in various fibrous tissues of the body are not infrequently encountered. They usually develop around the joints, and are fairly common in rheumatism.

Some **skin eruptions**, as **sudamina**, **purpura**, **urticaria**, and **erythema nodosum**, are believed to be of rheumatic origin. **Anemia** rapidly ensues, the skin being of a waxy or pale-yellow color.

Diagnosis is not infrequently quite difficult because of the slight joint-symptoms presented, but easy if a thorough examination of the heart is made and it found affected. **Tuberculosis, scorbutus**, and **rhachitis** must be excluded.

Prognosis.—This is generally better in children than in adults, but very unfavorable if the heart is early affected.

Treatment.—As soon as a case is diagnosed or suspected, the patient should be put at once to bed and kept at rest. For a time after subsidence of all symptoms, and especially after the child recovers, it should be guarded against exposure or chilling of the surface. No meats should be given; the diet largely liquid at first. Local applications during the attack give considerable relief, heat, chloroform liniment to which may be added aconite, or the following lotion (Fuller):

℞ Carbonate of sodium,	ʒvj ;
Laudanum,	℥j ;
Glycerin,	℥ij ;
Water,	℥ix.

M. et ft. sol.
Sig.—Apply to inflamed joints.

Mesotan applied locally is also of benefit.

Of the drugs administered internally, the salicylate group offers the best advantages, sodium salicylate being the best preparation, given in large doses, 40 to 60 grains in twenty-four hours to a child of five years. It is nauseous at best, and should be thoroughly disguised if that be possible:

℞ Sodii salicylatis,	ʒj ;
Essence of pepsin,	ʒss ;
Aquæ,	q. s. ad ℥j.

M. et ft. sol.
Sig.—One teaspoonful at dose.

Allay restlessness by giving opium in some form—Dover's powder or paregoric. Salol and salophen yield good results in rheumatism. The alkaline treatment is indicated after withdrawal of the salicylates, sodium bicarbonate being advantageous. Water should be taken freely, as should milk, if possible. Tonics, of which the best is iron, should be given when the child has recovered. The importance of the absolute recumbent position can not be too forcibly emphasized even though no organic lesion of the heart has developed, but this is even more important if an endocarditis or a pericarditis has been recognized.

TYPHOID FEVER.

Synonym.—**Enteric fever.**

Definition.—An acute infectious disease, caused by the specific bacillus of Eberth.

Etiology.—The disease is due to the bacillus of Eberth, which is conveyed to the intestines, as a rule, by water or milk, its infrequency in infancy being in a large measure due to breast-feeding in infants. More common in childhood. The bacillus has been found in all the organs of the body. One attack generally confers immunity.

Pathology.—Primary lesion is in the agminated glands, or Peyer's patches in the small bowel. These undergo a regular pathologic change, swelling, necrosis, ulceration, and cicatrization. There may be a catarrhal enteritis ; spleen is enlarged ; heart muscle is soft and flabby ; kidney and liver undergo change also, just as in adults, but less severe. Bacilli are found in enlarged mesenteric glands in greatest numbers.

Symptoms.—Much the same as in adults, save that duration is generally shorter and symptoms not so severe.

Periods of **incubation, fever,** and **defervescence** mark each case.

Onset is gradual as a rule, though it may be with vomiting, prostration, high fever, perhaps delirium or convulsions. There are usually increasing lassitude and weakness, headache, anorexia, gradual rise of temperature, diarrhea. **Fever** usually lasts about three weeks, the first week showing a gradual rise, with higher register both morning and evening than the day before, a week of more or less the same register each evening, and the third week a gradual fall, reaching normal about the twenty-first day. Temperature range the second week is from 102° to 104° F. each evening.

Pulse generally increases in frequency in proportion to the fever until the third week, when it continues to beat rapidly as the fever declines, and may be dicrotic.

Tongue is apt to be considerably coated from the beginning, coat becoming brown and the tongue dry in the third week.

Bowels are generally distended during the second and third weeks ; often constipated, especially at first, and diarrhea is apt to be of "pea-soup" character. **Hemorrhage** is infrequent, but it may occur.

Spleen may usually be felt enlarged, extending below free border of the ribs.

Eruption of rose-colored spots is found very often on abdomen, perhaps generally distributed, and is seen during the second week.

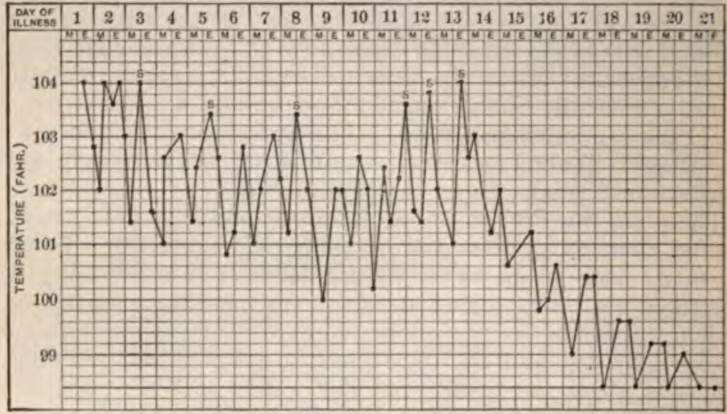
Nervous symptoms may be marked: headache, restlessness, and later apathy and stupor may supervene.

Prostration is marked and emaciation often extreme.

Relapses quite common; **perforation** is infrequent; **retention of urine** often happens.

Complications.—Albuminuria from degeneration of kidney cells; **pneumonia**; **bronchitis**; **otitis media**; **chorea**; inflammation of the **joints.**

FIG. 21.



Temperature-chart in typhoid fever. Boy, aged fourteen years. Sudden onset; chill.

Diagnosis.—Confirmatory symptoms are a continuous temperature which does not respond to quinine; coated tongue; rose-colored spots; tympanites; diazo reaction; Widal blood-test.

In **malaria** the plasmodium is found and quinine is a specific. In **tuberculosis** the diagnosis at first is difficult if the process is general; if localized, no mistake should occur. In **enterocolitis** the character of the stools should be sufficient for diagnostic purposes.

Prognosis.—This is good in children; the course is milder and shorter in duration.

Treatment.—Rest in bed; careful nursing, if possible by a trained nurse; **hydrotherapy** for temperature over 102.5° F.; sponging, baths, wet sheet, colon irrigations with cold water; **castor oil** and enemata for constipation; **bismuth** and if necessary **opium** for diarrhea; tympanites by **turpentine** stupes; **bromides** for restlessness and nervousness; careful attention to the mouth and teeth by **antiseptic washes**; disinfection of all vessels and bedding; individual eating utensils. **Diet** should be unirritating and easily digested; milk should be diluted, and if to a young child modified with a low percentage of proteids; stimulants as indicated, whisky is the best. Hemorrhage should be treated by starvation, morphine, and a very minute dose of adrenalin solution administered hypodermatically.

Convalescence should be watched very closely and ordinary diet returned to very slowly.

MALARIA.

Definition.—An infectious disease due to the presence of *Plasmodium malariæ*, characterized by chill, fever, and perhaps a sweat, with enlarged spleen.

Etiology.—Due to the *Plasmodium malariæ*, which gains entrance to the economy through the medium of a bite of the mosquito, the malaria mosquito being *Anopheles maculipennis.* Their **larvæ** are generally found in pools, ditches, back-waters, rivers, and canals. Crandall reports a case of intra-uterine infection. The **plasmodium** grows in the red blood-corpuscle, segmenting as a paroxysm approaches.

Pathology.—The spleen is enlarged almost uniformly; there is anemia, and in very severe cases hemoglobinuria.

Symptoms.—The **intermittent** and **remittent types** are encountered. The first-named begins with a chill and rapid rise of temperature to 104° or 106° F., with a fall very soon followed by profuse sweats. In infants and very young children this distinct type is not frequently seen; when it does occur, it may be of the **quotidian**, **tertian**, or **quartan type**. In the **remittent** form the temperature rarely reaches normal; the child is quite sick, and it may be difficult to diagnose the condition from typhoid. **Malarial cachexia** may follow either types, being due to the rapid destruction of the red blood-corpuscles and diminution of the hemoglobin.

Prognosis is good in acute cases, but when cachexia has developed it is not so good.

Treatment.—In the hot stage cold baths, ice locally to head; in the cold stage stimulants and friction. Following the paroxysm a **calomel purge**, then **quinine** in some form. The bisulphate may be given to very young children in solution; by the mouth or the rectum, or in emergencies may be given hypodermatically. **Euquinine** (a tasteless quinine), or some of the amorphous preparations, have been highly spoken of. Chocolate quinine tablets have been used with benefit. Quinine should be followed by arsenic and iron.

INFLUENZA.

Synonym.—Grip; La grippe.

Definition.—An infectious disease due to Pfeiffer's bacillus.

Etiology.—The **bacillus of Pfeiffer**, frequently associated with the streptococcus and diplococcus of pneumonia. Occurs in epidemics, principally in the winter and spring. Infants and children are especially liable to the disease. Germ gains access through the respiratory mucous membrane.

Pathology.—The lesion most often found is a catarrhal inflammation of the respiratory mucous membrane, frequently a pneumonia of the bronchial type. May be an inflammation of the stomach and bowels.

Symptoms.—Several types encountered: the **respiratory**, the **muscular**, and the **nervous**. Incubation period is short, lasting a few days to a week; there may be anorexia, lassitude, disturbed bowels, and irritability. Some attacks are sudden with chill and rapid rise of temperature, headache, and in the muscular form general aching of body, joints, and muscles. In respiratory form the respiratory symptoms predominate—coryza, sneezing, cough, and expectoration.

In nervous form may simulate meningitis—headache, photophobia, nervousness and restlessness, and irritability. Temperature generally high, 103° to 105° F. Prostration severe and convalescence prolonged.

Complications.—Pneumonia, bronchitis, enteritis, synovitis, otitis media.

Treatment.—Isolation; keep in bed; easily digested and nutritious diet; and the following prescription, varying the dose according to age of patient:

℞ Salolis,	gr. xij;
Pheno-bromatis,	gr. x;
Quininæ bisulph.,	gr. vj.

M. ft. capsulæ No. vi.
Sig.—One every two hours for child of six years.

℞ Aspirin,	gr. j to iv.

Chart. 1.
Sig.—One dose, repeated every two or three hours.

Stimulation where weakness and depression are great, and general tonic treatment in convalescence.

SYPHILIS.

Synonym.—Lues.

Definition.—A communicable disease, due to an unknown organism. Two forms are seen in children, **hereditary** or **congenital**, and **acquired.** The latter is the same as in the adult.

Etiology.—The disease may be transmitted to the child by the father, the mother, or both parents, parents in the primary or the secondary stage being almost sure to transmit it to the child. If the mother is infected late in pregnancy, the child may escape unless it becomes infected as it passes through the birth-canal.

Pathology.—No characteristic lesions may be found; but in most cases lesions are found in the bones, liver, spleen, and mucous membranes. In the **bones** there is an inflammatory process at the epiphysis with proliferation of the cartilage-cells. Late there may be **osteophytic growths** on the shafts of the long bones, due to a chronic periostitis. The **liver** may show an interstitial or gummatous hepatitis, or a combination. The **spleen** is enlarged. The mucous membranes of the mouth, trachea, and especially the nose, are thickened, showing a chronic catarrh, with often ulcerations from degenerated gummata. The septum may be perforated.

Symptoms.—Syphilis is a very frequent cause of abortion, and maceration of the skin of the fetus is nearly always found. If born at term, the symptoms develop most often about the third week, though there may be some at birth. These children generally show malnutrition, wrinkled skin, pustules or papules about the anus or generally distributed, or there may be one or all the different lesions. When symptoms appear later, there is a persistent coryza, "snuffles"; a hoarse cry, malnutrition, swelling of the joints due to an epiphysitis, and a pseudoparalysis may develop. Later, from the sixth to the tenth year, other signs of syphilis appear; the upper central incisor teeth are notched—the Hutchinson teeth; there are opacities of the cornea; deafness; periostitis, especially of the long bones, and breaking down of gummata, here and there forming ulcers. The glands, especially the epitrochlear, enlarge.

Diagnosis.—The coryza, hoarse cry, eruption, fissures about the anus and lips, and marasmus make a clinical picture of the early type easily recognized. Later symptoms—the Hutchinson teeth, deafness, adenitis, ulcerations, epiphysitis—are typical.

Prognosis.—Worse in infancy than in adults, chiefly because of the marked anemia present. Age, time of beginning treatment, perseverance, hygienic surroundings, diet, all influence it.

Treatment.—**Prophylaxis** is of greatest importance. No syphilitic should marry without having had at least two years of thorough treatment; if the mother contracts the disease after conception, there is still a chance of her bearing an unaffected child if she is vigorously treated from the beginning.

As soon as the diagnosis is made of hereditary syphilis the child should be placed on **mercurial treatment,** which is best administered by **inunction.** Other methods are in vogue—**fumigation,** by the **mouth, baths,** and **hypodermatically.** About 10 or 15 grains of ung. hydrargyri with equal parts of vaselin or lanolin should be rubbed in daily, changing the site with each rubbing—the flexures, back, and chest.

Internally gray powder in dose of 1 grain three or four times a day; the bichloride, grain $\frac{1}{60}$, three times a day; or the mild chloride in $\frac{1}{10}$ grain doses. If **tertiary symptoms** manifest themselves, use potassium iodide, and iron should be administered frequently during the course of treatment, which should be at least for one year.

QUESTIONS.

To what causes is diabetes mellitus attributed?
What symptoms present? How diagnosed?
Give treatment.
What is rheumatism?
Tell what is known of the etiology and pathology.
How does it differ clinically in children from the same disease in an adult?
What symptoms are found? How diagnosed?
Give treatment.
Define and give the etiology of typhoid fever.
Give the general pathologic changes. What are the symptoms and complications?
Give the treatment.
To what is malaria due, and how is the poison introduced?
Give varieties and symptoms of each variety. How treated?
To what is influenza due? What is the pathology?
What types are encountered?
Give the symptoms and treatment.
What is syphilis, and how many forms are met in children?
What is its pathology? Give the symptoms and prognosis.
How long should treatment be kept up, and when begun?
Give the treatment in detail.

CHAPTER XVI.

DISEASES OF THE CIRCULATORY SYSTEM.

DISEASES OF THE HEART.

NORMALLY the heart is placed more horizontally in the chest; the apex-beat is higher and slightly more to the left than in the adult, being found in the fourth interspace and to the outside of the mammillary line as late as the fourth year. This arrangement is probably due to the relatively greater size of the liver in childhood than at maturity. In percussing over the chest of a child the areas of dulness are **more** easily demonstrated because of the thinness of the chest-walls.

DEFECTS OF THE HEART.

Defects of the heart are **frequently found** at birth, and these are usually due either to a fetal endocarditis or to a malformation. The right side of the heart is usually affected in congenital valvular lesions.

The **lesions** found may be: 1. A defect in the **interauricular** septum, which may be a patent foramen ovale or an opening in some other part of this septum. 2. There may be an opening in the **ventricular** septum, either with or without an associated pulmonary orifice defect. 3. Congenital defects of the **aortic orifice** may exist, though they are quite rare, as these defects are usually due to a fetal endocarditis, and this rarely occurs on the left side. 4. Defects of the **pulmonary orifice,** by far the most common congenital lesion.

Symptoms of congenital heart lesions are shown principally in a general cyanosis associated with a heart-murmur. This is technically known as **morbus cæruleus,** and babies so affected are called **blue babies.** This condition is always increased by crying, and is more marked in an obstruction to the pulmonary orifice and in patent foramen ovale. **Dyspnea** and **orthopnea** may occur without apparent cause. **Bronchitis,** because of the passive congestion existing, is very apt to occur, and generally proves fatal. **Hemorrhages** may occur from the mucous membranes, and clubbed fingers and toes are frequently seen. When ruptured compensation occurs, edema of the lower extremities may be found.

Diagnosis of a congenital heart lesion is not difficult, though it may not be possible during life to localize the site of the lesion exactly. The murmur is usually systolic and quite loud, being heard with equal distinctness over a wide area.

Prognosis is always bad in these cases, but few living beyond puberty. The degree of cyanosis and dyspnea influence the prognosis.

Treatment.—Nothing can be done to affect the lesion directly; the principal indication being to guard against contracting the exanthemata, bronchitis, etc. Digitalis should be reserved for a rupture of compensation, and not given as a routine practice. The treatment is largely symptomatic.

PERICARDITIS.

Definition.—This is an inflammation of the pericardial sac, and rarely is found save as a complication of some general infective process, as the exanthemata, rheumatism, typhoid fever, and diphtheria.

Pathology.—The smooth membrane is injected and roughened, serofibrin may be effused, or serum in some amount, which may change to pus. On absorption of this a shaggy character of the membrane is left, the formation of adhesions following between the opposing layers of pericardium.

Symptoms.—The condition may not be recognized save by physical examination. Upon auscultation in the dry variety friction-sounds are heard with greatest intensity over the third and fourth interspaces. In the serous variety the area of dulness over the heart is increased, the apex of which is pointed upward. The heart-sounds are muffled and the heart action considerably interfered with. If the dry stage has been recognized previously, there is a disappearance of the friction-sounds upon the pouring out of the serum. There is a displacement of the apex-beat upward and outward, or a complete disappearance of it owing to a pushing backward of the apex, with an impinging against the chest-wall of the base with a visible pulsation.

Treatment.—As in other heart lesions, absolute rest in bed is the first essential in the treatment. The local application of ice is of the greatest value, at first for short periods, gradually applied longer until the bag is worn continuously. This is of a great deal more service than heat applied locally.

Opium is of service to control the pain and allay the nervousness. Strychnine is indicated also. But few drugs have any effect upon the effusion, which usually is absorbed. If the respiration is seriously affected and the heart action embarrassed from an extensive effusion, the fluid should be removed by tapping. Rotch advocates tapping through the fifth interspace near the mammillary line, thus avoiding the sternal margin. Tonic treatment is indicated upon recovery, and very gradual resumption of exercise or play.

CHRONIC PERICARDITIS.

Chronic pericarditis, frequently tuberculous in character, **may follow** one or two attacks of the acute form. The chief lesions are a thickening of the membrane with a serofibrinous exudation and the formation of greater or less firm adhesions between the two layers. There are few **symptoms** except some dyspnea on exertion.

There is no special **treatment** indicated.

ENDOCARDITIS.

Definition.—Endocarditis is an inflammation of the endocardium affecting chiefly that part forming the valves, in fœtal life the right heart being usually affected.

Etiology.—Rheumatism, the exanthemata, and septic infection are the most frequent causes. It is frequently seen as a complication of chorea.

Pathology.—The endocardium is swollen and injected, and often there forms a fibrinous coagulation on the surface. There are thickenings of the valves, and when these are in small areas they are called **vegetations.** If broken off and taken up by the circulation, they form emboli and may result in serious symptoms.

Symptoms.—As stated in the section on Rheumatism, there may be no symptoms beyond slightly disturbed heart action, some rise in temperature, and restlessness.

Physical Signs.—There are always a roughening of the heart-sounds and a murmur whose location varies according to the valve affected.

Prognosis.—Recovery is very rare without change occurring in the valve, but compensation may always exist, death being due to other conditions.

Treatment.—Absolute rest in bed over a long period of time should be insisted upon. An ice-bag applied locally over the precordial region is of great assistance. As long as the pulse is accelerated the child should be kept quiet and free from excitement. Opium and digitalis in acute stage, iron and tonics in convalescence are serviceable.

MALIGNANT ENDOCARDITIS.

This is **rarely seen** in young children, and when seen it is secondary to various acute diseases; most frequent in recurrent endocarditis.

Etiology.—Malignant endocarditis is essentially a septic condition due to the presence of the pus-producing organisms, streptococci, staphylococci, and pneumococci, these being found in the endocardium. **Streptococcus pyogenes**, the gonococcus, and **Micrococcus lanceolatus** may be found.

Pathology.—This is the same as in the adult, and is an aggravation of the process found in simple acute endocarditis, the vegetations upon the valves principally undergoing ulceration, extending to the endocardium at other parts of the heart. As a result of this ulcerative process small portions of these vegetations may slough off, forming emboli, and be carried by the circulation to remote parts, there to cause abscesses, as they contain the pus-producing organisms.

Symptoms are those of a general septic condition; the patient is in a typhoid state; delirium, prostration, irregular temperature, sweats, diarrhea, dry tongue, sordes. Petechial spots may develop and the spleen is always found enlarged.

Diagnosis is frequently difficult. Following upon an acute endocarditis this form is detected by the patient developing these septic symptoms: temperature, sweats, perhaps abscesses at various points from the infected emboli. Typhoid fever is often mistaken for this condition.

Prognosis is always most grave; nearly all cases die quickly.

Treatment beyond that of stimulation is of no avail.

CHRONIC ENDOCARDITIS.

Pathology.—This is really a sequel to acute endocarditis, its study being that of the physical signs found in the various lesions of the valves, the signs varying according to the valve involved and the nature of the pathologic process. If the increase in fibrous tissue is so great and in a location to prevent perfect closure of the valves, there will be a regurgitation; perhaps sufficient new tissue may be deposited to prevent the free onward flow of the blood at the same orifice, causing an obstruction. These lesions cause their own physical signs. If the heart muscle develops in proportion to the dilatation of the heart cavities due to the overwork or damming back of the current, **compensation** is said to exist, and this is possible in most cases of valvular lesion. *As long as this accommodation exists there will be no symptoms present unless the chest is auscultated, when the murmur will be heard.*

The mitral valve is most frequently affected; there may be a mitral **regurgitation** or **insufficiency**; or a **stenosis.**

The Physical Signs of Mitral Regurgitation.

Inspection.—The apex-beat is displaced downward and outward, and there is a visible bulging of the precordia, both varying according to the extent of hypertrophy existing.

Percussion.—The area of cardiac dulness is considerably enlarged, principally downward and toward the axillary line.

Auscultation.—A loud, blowing, systolic murmur is heard with greatest intensity at the apex, and transmitted around the axilla and heard under the angle of the left scapula. The first sound may be heard but faintly or not at all; the second sound in the pulmonary interspace is accentuated.

Ruptured compensation causes dyspnea, the heart is weak, the pulse ill sustained and of little volume. The blood is dammed back on the lungs, and the right heart suffers and is enlarged. There are cough; free expectoration, frequently bloody; edema of the lower extremities; disturbances of the portal circulation and of the functions of the stomach.

The Physical Signs of Mitral Stenosis.

Mitral stenosis gives a presystolic murmur, being caused by an obstruction to the flow of blood from the auricle into the ventricle. It is a much more serious lesion than the one just described, as compensation is not so frequent. Dilatation of the left auricle is present from overwork, and of the right side of the heart from damming back of the blood on the pulmonary circulation.

Inspection.—There may be seen a distinct impulse at the base, with a feeble apex-beat. There may be a general cyanosis, especially after exertion.

Palpation gives the important findings, in the **presystolic** thrill which is felt just before the ventricles contract, most distinctly in the fourth or fifth interspace on the left side.

Auscultation reveals a presystolic bruit heard with greatest intensity a little above and to the right of the apex-beat, but it is not transmitted. There is an accentuation of the pulmonary second sound, the first sound being normal.

If present early as a result of endocarditis, the child is stunted in its growth, and when there is a rupture of compensation the symptoms are largely those found in mitral regurgitation under the same conditions.

The Physical Signs of Aortic Stenosis.

Aortic lesions are comparatively infrequent, and when present are generally found with other lesions.

In **aortic stenosis** one of the most infrequent lesions is caused by a narrowing of the orifice from a previous endocarditis.

Inspection.—The apex-beat is displaced downward and outward owing to the development of the left ventricle.

Palpation may reveal a systolic thrill at the base. The apex-beat may be localized in this way; the pulse is usually good.

Auscultation.—There is a bruit heard on systole with greatest intensity over the aortic interspace (second right, near sternal margin), and is carried by the blood-stream into the great vessels of the neck.

The Physical Signs of Aortic Regurgitation (Insufficiency).

Aortic regurgitation primarily causes great enlargement of the left ventricle, very often associated with insufficiency of the mitral orifice.

Palpation.—The pulse may be of the characteristic "water-hammer" or "Corrigan" type, best demonstrated with the arm raised. The heart action is tumultuous.

Inspection may show visible pulsation in the larger arteries of the body, but this may not be detected in children. The apex-beat is displaced downward and outward.

Auscultation.—There is a soft blowing murmur heard over the aortic interspace and transmitted downward toward the xiphoid cartilage. It is diastolic in time.

Prognosis.—The prognosis of chronic endocarditis in children is not so good as in adults. The lesions most fatal are aortic regurgitation and mitral stenosis. A heart valve once crippled by endocarditis never becomes normal, but compensation may exist through the demands upon the system incident to puberty. If a child is closely guarded at this time, no serious trouble should develop. Acute illness, as pneumonia and typhoid fever, are serious complications.

Treatment.—*No treatment is required so long as compensation exists.* Exercise should be carefully regulated, the diet closely watched to prevent fermentation and embarrassment of the heart from collection of gas; daily bathing; regular hours for sleep; the administration of tonics if necessary.

If compensation ceases, active treatment for the heart is indicated. As in the other conditions of the heart referred to, absolute rest in bed should be insisted upon from the beginning of symptoms. Digitalis is the drug **par excellence** upon which reliance is to be placed. Of the many preparations, the following is the best, being an excellent diuretic as well as exerting its action upon the heart:

℞ Digitaline, amorphous (Merck's).
Sig.—In $\frac{1}{200}$ grain dose to child of five years.

Should there be much edema, the salines are of benefit, following a calomel purge. Diet is best reduced to milk. **Special** symptoms are treated as they arise.

ACUTE MYOCARDITIS.

Definition.—Acute myocarditis is an inflammation of the heart muscle itself. It is **secondary** to the infectious diseases.

Lesions.—The heart is feeble and enlarged, due to cell-proliferation. There are no **symptoms** typical of this condition, unless it can be recognized by a marked change in the character and frequency of the pulse occurring during the course of one of the acute infectious diseases.

Treatment is a general tonic and stimulating one. Strychnine, whisky, nitroglycerin; iron and cod-liver oil in convalescence.

FUNCTIONAL DISORDERS OF THE HEART.

Frequency.—Neuroses of the heart unconnected with organic heart lesions are rare in young children, but are quite frequent in children about puberty.

Etiology.—Indigestion, causing a disturbance of its activity by pressure; overwork at school; climbing stairs hurriedly; fright; anemia, and malnutrition. Heredity is a factor.

Symptoms.—*Tachycardia* frequently associated with palpitation; palpitation followed by the opposite condition, *bradycardia;* dyspnea, often increased by swallowing; increased respiration frequently; all occurring as a rule in paroxysms, lasting for a short while or several hours.

Diagnosis may be made from organic heart disease by careful and frequent physical examination of the chest.

Prognosis is good.

Treatment.—Removal of the cause if possible; correction of any dietetic errors and regulation of the feeding; stimulating food should be withdrawn; carefully regulated exercise; regular bathing. During the attacks valerian, aromatic spirit of ammonia, Hoffmann's anodyne, the bromides, and digitalis should be judiciously given. No special medicinal treatment is indicated between attacks.

ANEMIC MURMURS.

Importance.—These murmurs may be confounded with those produced by organic lesions, but without other signs than the murmur a diagnosis of organic lesion should not be made.

Physical Signs.—The anemic murmurs are best heard at the base, are usually systolic, and are heard in the great vessels of the neck, associated often with a venous hum. The pulse is not strong during the existence of the murmur. The murmur disappears with improvement in the general condition of the patient.

DISEASES OF THE BLOODVESSELS.

ANEURISM.

Aneurism **may result from** tuberculosis or syphilis. But few cases occur in young children, about the age of puberty being the most frequent time. The vessels most frequently affected are the abdominal aorta and arch of the aorta. Other vessels reported affected are the external iliac and femoral arteries.

Prognosis is grave, as these vessels are apt to rupture.

Treatment.—Antisyphilitic; surgical if aneurism is superficial.

NEVUS.

Synonyms.—Angioma; Mother's mark; Birth-mark.

Definition.—Nevus is a common congenital discoloration as a rule **due to** an increase in number and size of the capillaries.

Symptoms.—A nevus may enlarge in area after birth. It may be formed of erectile tissue, composing spaces through which the blood circulates. These areas may appear upon any surface and in any shape. Maternal impressions play no part in their causation.

Treatment aims to replace this angiomatous tissue with cicatricial tissue by use of electricity, caustics, scarification, or coagulating fluids injected hypodermatically.

QUESTIONS.

Define pericarditis.
What pathologic forms are found?
What are the symptoms?
What physical signs present?
Give treatment.
What pathologic changes occur in an endocarditis?
What are the symptoms and physical signs?
Give the treatment in detail?
What is malignant endocarditis?
What pathologic changes are found?
How is it diagnosed?
What is the treatment?
What is malignant endocarditis, and what pathologic changes are found?
How is it diagnosed?
What treatment is of any avail?
What valvular lesions may occur as a result of chronic endocarditis?
What are the physical signs present in the various types? Mitral regurgitation? Mitral stenosis? Aortic stenosis? Aortic regurgitation?
When is treatment indicated?
What general directions should be given a patient with a valvular lesion?
Define acute myocarditis.
What functional lesions of the heart may be found?
Define an anemic murmur.
Where heard?
Give treatment.
What causes aneurism?
How treated?
Define and give pathology of nevus.
How treated?
What are the anatomic differences between the adult and the infant heart?
What heart lesions are found at birth, and how recognized?
What symptoms are found?

CHAPTER XVII.

THE BLOOD AND ITS DISEASES.

Features of Children's Blood.—In some respects children's blood **differs from** that of adults; there is a relatively high proportion of eosinophile cells, about 0.5 per cent. higher than in adults. Leucocytosis is very easily produced in children by what would be apparently trivial causes in the adult, and the same may be said of anemia; in the newborn there is a condition of **polycythemia**, a dilatation of the superficial network of vessels in the skin; a **lymphocytosis** is normal to infancy; the hemoglobin is lower than in adults, though it is much higher for a few days after birth; the age and the degree of development of the child influence the state of the blood. The blood of the newborn has been considered pathologic by some observers, so much does it change during the first few months of life. An enlarged spleen is always associated with a lymphocytosis, perhaps primarily due to some constitutional disturbance underlying the anæmia.

ANEMIA.

The anemias of infancy are important. They have been **classified**: as to etiology as **primary** and **secondary**, and as to degree as **mild** and **grave** anemias.

Varieties.—Among the **primary** anemias are **chlorosis**, **anæmia infantum**, **pseudoleukemia** (von Jaksch), **leukemia**; and the **secondary anemias**, those blood-states produced by many constitutional diseases, such as syphilis, tuberculosis, rhachitis, scorbutus, acute gastritis, etc.

Symptoms.—Anemia may be associated with enlargement of the spleen, but there may also be an enlarged spleen without anemia. With the diseases mentioned may be associated all grades of anemia, with or without a leucocytosis, greater in severe cases, and associated with it are nucleated red cells. The **megaloblast**, "a large pale-stained nucleus in a very large cell," is rare in infants; the **myelocyte** is present in larger numbers in anemia of infants than of adults.

CHLOROSIS.

Definition.—This is a primary anemia occurring in girls about puberty. The hemoglobin is principally involved, the red cells also.

Etiology.—Arises from many conditions. **Intestinal auto-intoxication** is prominent, this acting as a cause through intestinal putrefaction interfering with the absorption of iron from the nucleo-albumins, though this is denied by some authorities. **Functional disorders of the nervous system, heredity,** the changes incident to **puberty, unhygienic surroundings, poor food, imperfect assimilative power of the stomach.**

Pathology.—The **specific gravity** is reduced; there is a marked reduction in **hemoglobin,** as low as 20 per cent. in some cases; the **red cells** are reduced, but in less proportion than the hemoglobin, but they are changed in morphologic characteristics. They are pale without being changed in shape; in mild cases and in severe cases they vary much in size. **Poikilocytosis** is seen in severe cases. When improvement takes place, the red cells increase in number and gradually assume the normal amount of hemoglobin. The **leucocytes** are generally not materially changed. **Myelocytes** are rarely found.

Symptoms.—There is a disinclination for physical exertion, which finally becomes impossible. There are palpitation of the heart, dyspnea, dizziness, and vertigo when arising suddenly from the recumbent position. Menstruation, if not entirely absent, is very irregular, with very little flow of light color; the appetite is poor, the skin has a greenish tinge, and the mucous membranes are all pale; there is constipation. It is gradual in its onset and will not improve without treatment. Several **clinical types** are recognized: (*a*) those in which the red cells are unchanged in shape and remain about the normal number (4,000,000) with a low percentage of hemoglobin; (*b*) the red cells are below 4,000,000 without change in shape of cells, the hemoglobin is low, and the patient is more depressed generally; (*c*) the red cells are reduced, from 3,500,000 to 3,000,000, the cells are changed in shape, the hemoglobin is low. In class (*a*) these patients respond quickly to iron, class (*b*) more slowly, class (*c*) quite slowly and tend to relapse.

A **systolic murmur** is often heard over the base of the heart with a **venous hum** in the neck.

Prognosis is good if treatment is persisted in.

Treatment.—Remove the cause if possible; regulate the diet; prohibit sweets; regulate the bowels; exercise; daily bathing; and the administration of iron. Iron may be given in many forms, tincture of the chloride to young children, and older children carbonate of iron. Blaud's pill, with or without aloes, may be given to advantage.

℞ Tincturæ ferri chloridi, f℥ss;
Acidi phosphorici diluti, f℥vj;
Spiritus limonis, fʒij;
Syrupi simplicis, q. s. ad f℥vj.
M.
Sig.—Dessertspoonful in water after eating.

℞ Acidi phosphor. dil.,
Acidi nitro-mur. dil.,
Acidi sulphurici aromat.,
Tr. ferri chloridi, āā f℥ss.
M.
Sig.—Twenty drops in half-glass of water.

SECONDARY ANEMIA.

This form of anemia is **secondary to** other conditions, as a hemorrhage, inanition, tuberculosis, syphilis, acute septic conditions, malaria, improper food, unhygienic surroundings, etc.

Pathology.—Practically the only changes are those which occur in the blood; the hemoglobin is greatly reduced, and the red cells decreased in number, though less than in children suffering from primary anemia.

Symptoms.—There is an aggravation of the symptoms resulting from the primary disease; pallor is increased in skin and mucous membrane; palpitation of the heart; disinclination and disability for exertion; headache; irregular bowels and appetite.

Prognosis depends entirely upon the principal disease, the cause of the anemia.

Treatment.—The underlying disease must be cured first; regular diet and bowels; careful exercise not beyond fatigue; daily bathing. Iron, arsenic, and strychnine are indicated and give the best results; the syrup of the iodide of iron being assimilated best by children, and Fowler's solution of arsenic being the best preparation of that drug. Strychnine may be given in relatively large doses in pill-form. Cod-liver oil is a valuable adjuvant in some cases, but should only be given in winter, and preferably the pure drug.

PERNICIOUS ANEMIA.

Synonyms.—**Progressive pernicious anemia**; **Anæmia infantum**; **Pseudoleukemia** (von Jaksch).

Definition.—This is a disease of the blood primarily, characterized by a fatal anemia, morphologic changes in the red cells, and changes in the bone-marrow.

Pathology.—The red cells are markedly reduced to about 1,000,000; **megalocytes** form a majority of the cells; in some cases **megaloblasts** are very rare, in others are numerous; **hemoglobin** varies, it may be above normal; **rouleaux** do not form; **coagulation** is tardy in fresh blood; the **red cells** are degenerated; **leucocytes** are reduced; **eosins** are deficient; **blood** is reduced in amount; the **specific gravity** is low.

Diagnosis.—There are megaloblasts and megalocytes, and an increase in hemoglobin; there may be an excess of megaloblasts over normoblasts. "The diagnosis may require the complete summation of all the clinical and morphologic data, as well as observation on the course of the disease, or even the microscopic examination of the marrow." It is rare in children.

Prognosis is grave, though severe cases have been reported as cured. A high percentage of hemoglobin with well-marked changes in the blood and marrow are unfavorable. Leucocytosis is very unfavorable.

Symptoms.—The affection is insidious in its development. The symptoms are those of a grave anemia: pallor of skin (with later a lemon-yellow color) and of the mucous membranes; weakness, dyspnea; anemic heart-murmurs; loss of flesh; flabby muscles; malnutrition; hemorrhages may occur on mucous surfaces, in the eye, subcutaneously; later edema develops, probably ascites; there is scanty urine, but generally no albumin; it is chronic in its course.

Treatment.—The same general care of the patient as referred to above in other forms; regulate diet and the bowels. Arsenic is the sheet-anchor in this condition, giving better results than iron. It should be given in small initial doses, gradually increasing until the full physiological effect has been reached.

LEUKEMIA.

Definition.—In this disease there are a great increase in the number of leucocytes, and a diminution in the number of erythrocytes and in the quantity of hemoglobin. There may be involvement of the spleen, glands, and marrow.

Etiology.—Leukemia may occur at any age; heredity is an element in its causation; trauma; intestinal intoxication; improper hygiene; syphilis; malaria; influenza; tuberculosis; rickets may enter into causation.

Pathology.—The essential changes are in the blood, bone-marrow, spleen, and lymph-glands. The chief changes are in the marrow. In the myelogenous form the neutrophile myelocytes are increased in number and are quite large. In the lymphatic form the small mononuclear cells are increased, and the marrow may be found slightly or not at all involved. The **liver** is enlarged, due to metastatic growths, more pronounced in the lymphatic types. The **spleen** is enlarged, there being a hyperplasia of the large and small mononuclear cells; there is at first simply a hyperplasia, followed later by continuous increase in the size of the organ. The **lymph-nodes** show signs earlier, perhaps, than any other organ, reaching the size of an egg or larger; their capsules are intact. The coagulability of leukemic blood is greatly diminished and may be lost; the red cells are usually reduced to 3,000,000 or 2,000,000. The leucocytes are greatly increased, there are usually from 100,000 to 200,000, varying in number at different periods of the day. Ewing considers "eosinophile myelocytes with granules of very unequal size and density of stain are pathognomonic of myelocythemia."

Symptoms.—Insidious in onset; increasing pallor and disinclination for exertion; hemorrhages in retina and skin may occur later. Enlargement of the abdomen occurs early. Heart action is feeble, the enlargement of the superficial and deep lymphatic glands takes place early. Duration is six months to one year.

Diagnosis.—This may be made from the state of the blood alone.

Prognosis is unusually grave.

Treatment is of little avail, iron, arsenic, and strychnine give best results in connection with the best possible hygienic surroundings, good food, fresh air, etc.

PSEUDOLEUKEMIA.

Definition.—"A primary disease of the lymphatic structures, characterized by progressive enlargement of various chains of lymph-nodes and of the spleen, by metastatic growths of lymphoid tissue in many localities, and by progressive anemia, but differing from leukemia chiefly by an absence of marked leucocytosis."

Etiology.—The disease is more frequent in boys than in girls; syphilis, tuberculosis, and malaria are predisposing causes. There is a connection between hyperplasia from inflammation of the lymph-nodes, and lymphosarcoma and lymphatic leukemia.

Pathology.—In the early stages the anemia may be slight; with the progress of the disease there is a progressive loss of red cells. The cells are usually undersized, nucleated red cells are rare, the hemoglobin is decreased. The white cells are usually unaffected, being of the normal number or slightly reduced.

The lymph-glands are enlarged, hypertrophied, having no tendency to suppurate or caseate; the glands of the neck, axilla, and groin are usually first involved. Lymphoid tissue may be found in the spleen, liver, kidneys, and other organs.

Symptoms.—The first symptom is enlargement of some of the lymph-glands, those of a certain locality taking on the process first. This is followed by constitutional symptoms later, those which are found in anemia from other causes: pallor, weakness, languor, fainting, dizziness, indigestion, etc. Later fever occurs; hemorrhage from the mucous surfaces and in the skin is common; there is edema of the extremities; delirium and coma precede a fatal termination with probably convulsions.

Pressure-symptoms may occur from the enlarged glands, dyspnea and dysphagia from those in the neck, and from enlarged thoracic glands pressing on the trachea and esophagus, edema of legs from inguinal glands causing pressure on vein. The glands are not tender to pressure and are freely movable under the skin. The disease lasts a long time.

Diagnosis.—From myelogenous or pronounced lymphatic leukemia, by the blood failing to show leucocytosis. From tuberculosis of the lymph-nodes by microscopic examination of the nodes; inflammatory hyperplasia of the lymph-nodes causes irregular fever, polynuclear leucocytosis, and suppuration. Splenic anemia usually shows few changes in the blood.

Prognosis.—Patients may live a long time, and show slight improvement at times. Recovery does not take place.

Treatment.—Good food, favorable hygienic surroundings, pure air, and regulated exercise. The iodides do good in some cases; arsenic is the remedy upon which reliance may be placed.

Surgery as a routine procedure is not to be recommended, but should be reserved for those cases in which pressure-symptoms exist.

ADDISON'S DISEASE.

Definition.—A disease characterized by anemia, languor, and debility, deposit of pigment in the skin, and by disease of the suprarenal capsules.

Etiology.—A rare disease in children. But little known of causation.

Pathology.—Microcytes are sometimes numerous; leucocytes commonly diminished, eosinophile cells slightly increased. Hemoglobin is decreased. The suprarenal capsules are degenerated, generally from tuberculous infection.

Symptoms.—Loss of strength and flesh; mental hebetude; general irritability; dyspnea; nausea, and vomiting. The skin is bronzed in appearance, more marked on the exposed surfaces, though patches may be seen elsewhere and in the mucous membranes. As death approaches there is generally an aggravation of the symptoms, deeper mental apathy, coma, convulsions, and death.

Prognosis is uniformly bad. Cases may live several years.

Treatment should be tonic and supportive. Rest, careful diet, bathing, and the administration of iron, arsenic, strychnine, and codliver oil.

HODGKIN'S DISEASE.

Synonym.—**Adenie.**

Definition.—This is typically a lymph-node disease, but may be considered here. It is characterized by a general hyperplasia of the lymph-nodes throughout the body, marked anemia, and a fatal termination.

Pathology.—There is a simple hyperplasia of the lymph-glands, suppuration rarely occurring. There is a deposit of lymphoid structure in the spleen, liver, and other organs. An anemia is also present, a reduction in the red corpuscles and an increase in the lymphocytes.

Symptoms.—Come on gradually, the anemia or the enlargement of the glands being noticed first. Pressure from the glands may cause local symptoms. The glands may reach a very large size.

Treatment.—A tonic treatment with increasing doses of arsenic gives best results.

HEMOPHILIA.

Definition.—A hereditary disease in which there is bleeding, oftentimes profuse, from slight wounds. One so affected is called a "bleeder."

Etiology.—The hereditary tendency is marked and may be traced through a number of generations. Males are oftener affected than females, but the transmission is more frequent through the mother, she herself escaping. There may be nothing else abnormal.

Pathology.—There is no distinct pathology, its exact nature being unknown.

Symptoms.—Nothing abnormal, as a rule, is detected in the child at birth. This tendency toward bleeding develops during the first two years of life, being accidentally discovered as a rule by a bleeding following a trivial wound. The bleeding may be spontaneous or from trauma; it may occur from any organ, mucous surface, from the skin or following a cut of the skin. Swellings of joints may occur.

Prognosis.—Few children so affected live till puberty, and if this period is reached the patient may outgrow the condition. There is no tendency to excessive bleeding in females during the menses or post partum.

Treatment.—As the diagnosis can only be made by the occurrence of severe bleeding from a little scratch, the treatment is primarily to stop the hemorrhage by surgical means. The family and the patient if sufficiently old should always be told of this peculiarity and warned against having any surgical work done. Drugs to stop the hemorrhage have no effect. Thyroid extract has been used with excellent effect. (Fuller.)

PURPURA.

Synonyms.—Divided into **purpura simplex** and **purpura hæmorrhagica**, also called **morbus maculosus, Werlhof's disease,** in the latter there being hemorrhage from mucous membrane also.

Etiology.—It is a common disease in children, as their bloodvessels are immature, allowing extravasation readily. It may be due to a septic condition, as is present in endocarditis of the malignant type, in the exanthemata; as a result *of exhausting* diseases, as bronchopneumonia, tuberculosis, etc.; from certain drugs, as quinine, phosphorus, etc.; in whooping-cough from venous stasis.

Pathology.—No changes have been detected in the blood, but there are changes in the vessel-walls, an endarteritis, especially of the capillaries.

In the ordinary type the hemorrhage is in the skin, in the severe form there is hemorrhage also from the mucous membranes, into the joints, and from the viscera. There may be cerebral hemorrhages.

Symptoms.—In the ordinary form the hemorrhage into the skin is usually preceded by two or three days of indisposition, with perhaps vomiting, diarrhea, and headache. The spots may be few and widely separated, small or large, dark red, but changing to a purple hue and later brown, leaving a pigmentation after they disappear. Recovery generally takes place in this form in a few weeks, but relapses are common.

In **the hemorrhagic form** there are hemorrhages from the mucous membranes as well as into the skin, accompanied by grave constitutional symptoms in its onset. There may be vomiting of blood, bloody stools, epistaxis, exophthalmos from post-orbital hemorrhage, hemorrhage from the bladder or kidney. The hemorrhagic spots vary from a few petechiæ to hemorrhagic areas as large as the hand, such a spot always appearing upon the slightest bruise. The temperature may reach 101° to 103° F., and if the hemorrhage is copious there may occur a sloughing of the hemorrhagic spots, these cases being called gangrenous. As a complication of rheumatism purpura may occur, called **purpura rheumatica.**

Diagnosis.—From **scurvy**, chief diagnostic points are the spongy gums in this disease, diet, and pain in joints; from **hemophilia** by family history.

Prognosis.—Depends largely on age and cause, the mild variety is rarely fatal, the hemorrhagic type often so. Relapses are common.

Treatment.—Relieve the cause; rest in bed; or absolute quiet; and a general tonic plan of treatment. Drugs are impotent in preventing the bleeding though a number are recommended. Vegetable acids, ergot, aromatic sulphuric acid;

togics, as iron and strychnine, administered after hemorrhage has ceased. Stimulation when there is fever or toxemia.

QUESTIONS.

In what does children's blood differ from that of adults?
How many forms of anemias are encountered?
What is chlorosis? What are the causes?
Describe the blood-changes.
What are the symptoms in the various clinical types?
Give the treatment.
What pathologic changes are present in secondary anemia? Give the symptoms and treatment.
What is pernicious anemia?
What pathologic changes in the blood are found?
How diagnosed?
What symptoms present?
Give the treatment.
Define leukemia and give its causes.
What pathologic changes in the blood and in the general economy?
What are the symptoms?
Give the prognosis and treatment.
In what respect does pseudoleukemia differ from leukemia?
Give its symptomatology and pathology.
What is the treatment?
Define Addison's disease.
What are its pathology and symptoms?
Give the prognosis and treatment.
Give the pathology, symptoms, and treatment of Hodgkin's disease.
What is hemophilia?
What is the chief cause?
How manifested?
Give treatment.
What is purpura, and how is it clinically divided?
What are its causes?
Give the symptoms of the ordinary form the hemorrhagic form.
How diagnosed from scurvy and hemophilia?
What are the prognosis and treatment?

CHAPTER XVIII.

DISEASES OF THE LYMPHATIC GLANDS.

THE lymph-glands or nodes are very apt to take on hyperplastic process during infancy. The enlargement is due in a great measure to surroundings, heredity, previous illnesses. Any group of glands of the body may become enlarged separately.

ACUTE ADENITIS.

Definition.—An acute inflammation of the lymph-nodes.

Etiology.—An inflammation of the neighboring mucous membranes is a frequent cause, though the area of inflamed tissue may be very small, the group affected being due to the area involved. Especially liable to occur in infants, both in healthy and delicate children.

Pathology.—There are congestion of the glands, edema and hyperplasia of the lymphoid structure. If the inflammation is very violent, the glands break down and suppurate.

Symptoms.—If secondary, the temperature again rises, the glands affected are swollen, painful and tender, skin not reddened. The tumor may reach quite a large size, and if suppuration occurs, unless an adjoining gland is infected, the local symptoms disappear on evacuation of the pus. If this does not occur, the swelling subsides unless they become chronically enlarged—perhaps caseous, but not suppurating.

Prognosis.—Good. In run-down children suppuration is more likely to occur. It may become chronic.

Treatment.—Attention to acute catarrhal conditions in health and disease. Hot applications, or cold if more grateful, or if suppuration does not seem inevitable. If tending to become chronic, potassium iodide is an excellent remedy, the syrup of iodide of iron being a good combination.

CHRONIC ADENITIS.

Definition.—A chronic inflammation and hyperplasia of the lymph-nodes. Comparatively infrequent, generally following an acute inflammation. It may result from a chronic inflammation of the skin or mucous membrane, the location depending upon the region drained.

Symptoms.—There is generally an enlargement of the glands on both sides of the neck, unusually an isolated gland is enlarged, generally it is a group or several groups, and not infrequently there is an associated enlargement of tonsils and adenoids of the nasopharynx. There is no tendency to suppuration, the process being simply a hyperplasia of connective and cellular tissue. The tendency is to run a subacute or chronic course, remaining stationary for several months and gradually growing smaller.

Diagnosis is generally from tuberculous adenitis and enlargement due to syphilis. Simple adenitis occurs mostly in children under ten years of age; there is no tendency to suppuration, the gland being usually movable under the skin, and they reach their maximum size more quickly. Diagnosis may be practically impossible.

Treatment.—Remove or alleviate the cause. If located in the nasopharynx, treatment should be directed to that point. Massage and painting with counterirritants are of no avail. Potassium iodide, syrup of the iodide of iron, and arsenic are efficient remedies, with good hygienic surroundings and good food. Oleum morrhuæ is always of benefit.

TUBERCULOUS ADENITIS.

Synonyms.—Scrofulosis; Scrofula.

Etiology.—The lymphatic system of young infants is very prone to develop a tuberculous inflammation; the younger the child the less likelihood of its developing elsewhere than in the glands of the interior of the body; the external glands are seldom involved until after the third year.

There is generally a tuberculous family history, an infection with the tubercle bacillus, and an associated inflammation of contiguous structures, skin or mucous membrane, as an exciting cause. The nearby inflammation prepares the soil; the seed, the bacillus, is ever present to begin its work. The acute infectious exanthemata may be a predisposing cause.

Pathology.—Swelling and inflammation of a tuberculous origin. The glands show the usual changes of structure due to this bacillus, a deposit of white cheesy masses here and there which finally coalesce forming a large mass of caseous material, with involvement of surrounding tissues. The skin is dark from becoming adherent to the gland, and when suppuration takes place it generally ruptures here, leaving as a rule a stellate scar which is depressed and adherent to the underlying structures. A chain of glands may become involved.

Symptoms.—There may be no symptoms but the swelling, which is very gradual in one or more groups of glands, and finally there is a coalescence of the neighboring glands. The process may at once go on to suppuration or remain dormant for some time, with occasional exacerbations; on these occasions the glands may be quite tender and painful. If suppuration occurs, there may be a breaking down of the gland without involvement of surrounding structures or a diffuse suppurating process. When fluctuation has occurred and pus is known to be present, a free incision should be made in order to prevent its spontaneous rupture, the inevitable result being a disfiguring scar. Tubercle bacilli are in the pus.

Prognosis.—Recovery may be expected in most cases, though the presence of a tuberculous inflammation at any point may result in a general infection at some other time.

Diagnosis is to be made from simple chronic adenitis, syphilitic enlargement, and Hodgkin's disease. In this condition the course is slow, the tendency is to caseate and form abscesses, and to occur in children over three years of age.

Treatment.—Treat local areas of inflammation which may act as exciting causes, tonics, change of climate, codliver oil, careful feeding, exercise and bathing, guarding against exposure, and free incision when necessary.

SYPHILITIC ADENITIS.

This condition is **more often seen** in the acquired form of syphilis than the hereditary, but in either variety it is a rare condition.

Perhaps the most frequent **site** for the enlargement is the epitrochlear gland, and an enlargement here is always suggestive of syphilis.

The **diagnosis** should be easy if other symptoms are taken into consideration, and it being confirmed by the administration of antisyphilitic remedies.

Treatment.—Inunction with mercurial ointment, 50 per cent. strength, is an excellent measure and yields good results. The ointment should be rubbed into the flexures, over a new area each night.

QUESTIONS.

How is acute adenitis caused?
Give the symptoms, prognosis, and treatment.
What is the pathology of chronic adenitis?
Give symptoms and treatment.
Under what name is tuberculous adenitis sometimes known?
What is the pathology?
What symptoms present? How diagnosed? How treated?
Discuss syphilitic adenitis and give the treatment.

CHAPTER XIX.

CONTAGIOUS DISEASES.

ACUTE INFECTIOUS EXANTHEMATA.

THE poisons of the acute exanthemata are transmitted from one person to another probably through the medium of the air. They are not contagious to the same degree, measles and smallpox being quite so, scarlatina and varicella less so. One attack generally confers immunity, but this is not an inviolable rule; they usually occur in epidemics or endemics. It is not impossible for two distinct exanthematous diseases to exist in one individual at the same time.

MEASLES.

Synonyms.—Rubeola; Morbilli; Masern.

Definition.—An acute, eruptive, febrile disorder, caused by a specific contagium, characterized by acute catarrhal symptoms of the eyes and air-passages, eruption, and fever. The contagium is widely distributed and practically never dies out in large cities. Individual susceptibility is greater at one time than another, thus disproving natural immunity. Child during first six months not very susceptible, though an infant may have measles in utero. The specific organism causing measles has not been isolated. Infection may occur at any time during the attack: before the eruption feebly; more so during the eruption, and quite so during desquamation. It is not believed now that the infection may be carried from one person to another by clothing, toys, etc., though this has been the belief for a long time. Sporadic cases may develop.

Symptoms.—These are divided generally into those of the period of incubation; invasion or prodromal stage; eruption or desquamation.

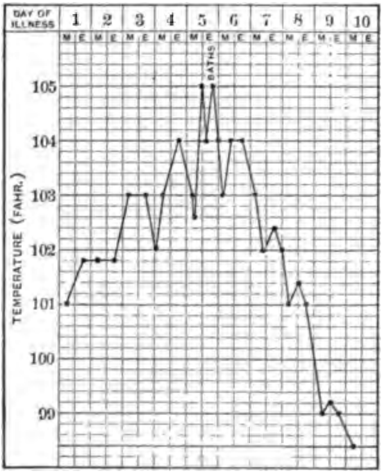
Incubation.—This period generally lasts from nine to fourteen days after exposure, with an average of about eleven days. There are practically no symptoms discoverable at this time, though there may be languor, loss of appetite, perhaps chilliness.

Stage of Invasion.—There is an increased feeling of hebetude and languor, headache, followed shortly by coryza, lacrymation, sneezing, dry throat, cough, probably croupy in character, though there may be some signs of a mild bronchitis; photophobia. **Temperature** rises steadily from 102° to 104° F., with slight remissions in the morning. Unless the **buccal eruption** first described by Koplik is noted at this time, the condition may be mistaken for a cold. This eruption shows as numerous red spots varying in size from that of a pin-head to that of a split pea on the inner surface of the cheeks, lips, gums, and soft palate. In a direct light dull-white specks may be seen on the top of these red spots. These spots may be seen two or three days before the eruption appears, and are considered pathognomonic of measles. The **enanthem**, the eruption on mucous surfaces, appears before the eruption on the skin. There may be vomiting at this time.

Eruptive or Efflorescent Stage.—The eruption generally appears from the fourth to the sixth day after the appearance of the catarrhal symptoms. It appears first about the eyes and on the face, chest, and extremities. It shows at first as a small red papule, gradually spreading, raised, and of a dark-red hue. These rarely coalesce over the entire body, islands of normal skin being detected. With the appearance of the rash all the symptoms increase; the eyes are painful from the conjunctivitis present, and photophobia is quite marked. There is often itching of the skin due to the excessive perspiration.

When the exanthem is fully developed, the general symptoms subside, which is in from four to five days from its first appearance; the temperature reaches normal in three or four days. The pulse is frequent, and if much involvement of the bronchi is present, the respirations are short and hurried.

FIG. 22.

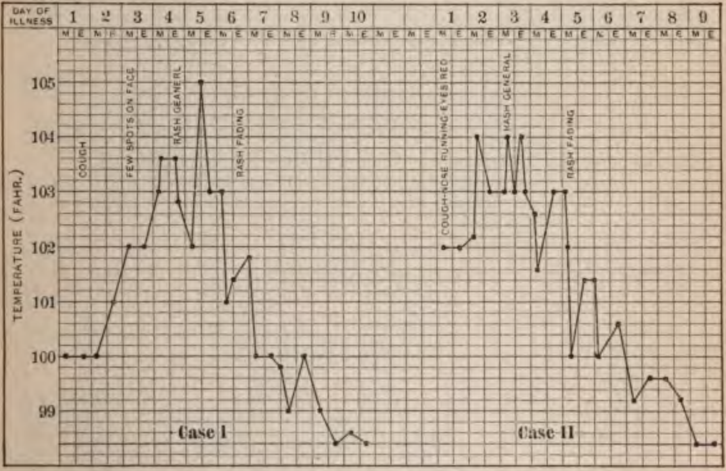


Measles, four days' incubation. Rash faded thirteenth day.

Stage of Desquamation.—The eruption disappears first from the mucous membranes, leaving them inflamed, then from the skin in the order of its appearance, leaving it in a slightly roughened state, with a fine, branny, scaly desquamation. This is generally more severe if the fever has been very high and the eruption marked. The temperature is normal when the eruption fades. This stage lasts from ten to fourteen days. There are generally some prostration and a short period of convalescence, during which time the cough slowly disappears.

Atypical Forms of Measles.—Cases may occur without the catarrhal stage with little or no exanthem. The exanthem may be so slight as to escape notice. The **severe** or **malignant** types are often seen in epidemics, many terminating fatally. These cases usually occur in the run-down and in those amid bad hygienic surroundings. If there is severe eruption with early involvement of the internal organs, there may be a fading of the rash, which is an unfavorable sign. It is the "striking in of the rash," supposed by the laity the cause of fatal outcome, but it is really due to the complication, pneumonia, etc., found in these cases.

Fig. 23.



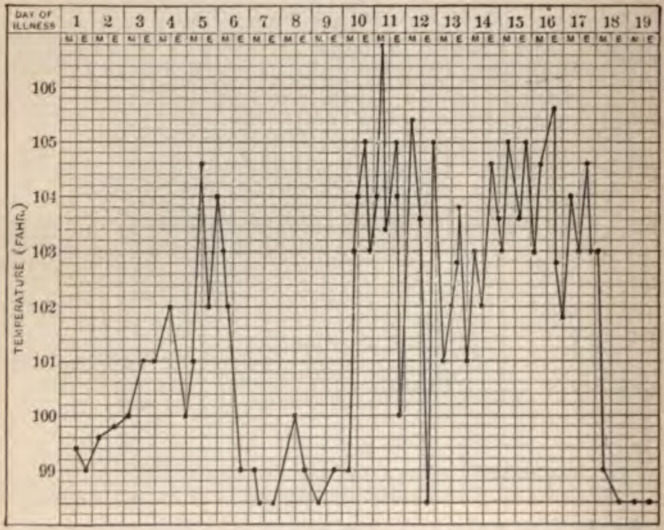
Measles.

Those cases presenting typhoid symptoms are referred to as **typhoid** form. When the eruption shows the presence of blood, a bluish-black color, it is the **hemorrhagic** form, or

black measles. The malignant type in which there is severe bleeding is not often seen now.

Complications of Measles.—Sudamina may appear during the early efflorescent stage, which may cause itching; **eczema** may occur, as may **furunculosis, urticaria,** and **herpes.** The **eyes** remain weak and subject to conjunctivitis for some time. **Otitis media,** an inflammation through the medium of the Eustachian tube, may occur. **Laryngitis** may develop, catarrhal in type as a rule.

FIG. 24.



Measles. Pneumonia.
Boy, five years old.

The **lungs** are more frequently involved; the process may be simply a **bronchitis,** or the involvement may extend further and a **bronchopneumonia** develop. This complication is the most fatal of all others. **Stomatitis** sometimes is seen, as well as a **tonsillitis. Chorea** has been credited to measles by some.

Albuminuria is sometimes present, but usually is not of much moment.

Prognosis.—Uncomplicated measles is usually not very serious. The greatest mortality is in children under two years of age because of their susceptiblity to pneumonias. Croup, diarrhea, diphtheria, hemorrhagic form, influence the prognosis unfavorably.

Treatment.—Prophylaxis.—Complete and thorough isolation is the best means of prophylaxis. Because of our being unable to judge of the individual susceptibility of children all should be prevented from contracting it if possible. Measles is dangerous to life in itself, and frequently leaves serious complications, hence the necessity of preventing contagion. The disease is contagious before the rash appears and for three or four weeks after it disappears.

Curative Measures.—Isolation, careful disinfection of cloths used for nose; disinfection of excreta and of utensils used by patient; bathing after recovery. Large, airy, and light room, with eyes protected from glare, temperature of which should be from 68° to 70° F.; cleanliness; bathing for temperature of 103° or over; diet; and the treatment of the special symptoms as they arise.

SCARLATINA.

Synonym.—Scarlet fever.

Definition.—An acute, specific, contagious, and infectious febrile disease, characterized by its sudden onset, an erythematous rash followed by desquamation. It may occur in many forms, from a mild to a severe or malignant type. It may not affect every individual exposed to the contagion, being much less contagious than measles. Its symptomatology may be divided into the stages of **incubation, invasion, eruption,** and **desquamation.**

Stage of Incubation.—This stage may last from a few hours to two weeks with an average of about six days.

If the infection has been through the medium of a wound, the incubation period is shorter, and the virulence of the epidemic also influences it. There are few symptoms of import during this stage.

Stage of Invasion.—Of short duration, twenty-four hours or less; onset sudden, in apparently healthy persons; there are loss of appetite, irritability, headache, aching in limbs, dryness of throat, vomiting, chilliness, diarrhea, beginning temperature, and rapid pulse. The tongue is coated, with red edges, and the papillæ seen above the surface, the so-called "strawberry tongue." The tonsils are swollen and red and the whole buccal mucous membrane is injected.

Stage of Exanthem.—This shows itself first on the upper part of the chest; extends to the neck, body, and flexor surfaces of the extremities. It consists of red papular elevations about the size of a small pin's head, very close together, so that the entire surface has a scarlet flush. The coating of the tongue soon disappears leaving a red base. The tonsils are swollen and red, often covered with a gray pseudomembrane. The glands of the neck are enlarged, as are those of the groin and axilla and under the jaw. Usually at the end of the third day the rash begins to fade, having taken from two to three days to appear.

Stage of Desquamation.—Desquamation usually begins over the area of skin first involved, soon appearing over the body, and is of a branny or furfuraceous nature; that of the hands and feet is called **membranacea** or **lamellosa**, the skin of a finger coming off like a cast. The duration of this stage is from six to eight weeks as a rule, though it may be shorter.

Atypical forms of scarlatina are the **scarlatina anginosa** or the **septic** form, and **scarlatina maligna** or **toxic** scarlatina. The first named shows severe initial symptoms, with marked involvement of the pharynx and tonsils quite early. There may be but little or no eruption in this type, this being referred to as **scarlatina sine exanthemata.**

The malignant form occurs in only about 2 per cent. of cases; and is characterized by very sudden onset and an overwhelming of the system by the scarlatinal toxin. There may be added to the severe toxic symptoms hemorrhage into the skin and mucous surfaces, with probably an imperfect development and distribution of the rash. The pulse is rapid and weak, and the patient goes rapidly into a stage of collapse followed shortly by death.

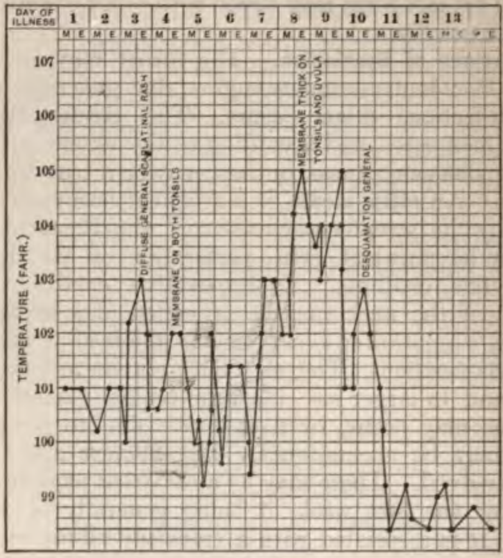
Irregular forms of scarlatina may exist; there may be a **scarlatina sine exanthemata,** without the rash, or a **scarlatina sine angina,** without sore throat, or without fever, **scarlatina a febre.** This last form may occur with other exanthemata—varicella or measles.

Complications of Scarlatina.—The throat may be severely affected. Pseudomembranous angina, due generally to streptococcic infection, often occurs. The tissues frequently slough in these cases, and according to the extent is the other division, **angina gangrænosa,** or there may be a true diphtheritic membrane. An **otitis media** is a frequent occurrence, due to infection by the streptococcus through the Eustachian tube. Otitis may be purulent, with perforation of the drum and probably total deafness. A suppurative condition of the lymphatics of the neck may occur, called also **angina Ludovici,** and if suppuration is severe it is referred to as a **phlegmonous inflammation.** The maxillary glands are most often enlarged and to larger size than the others. **Acute articular rheumatism** may occur, or a **synovitis** due to streptococcic infection may be encountered. The **kidneys** are most frequently involved. There may be a **catarrhal nephritis,** occurring during the first week, it being generally of moderate severity. It is associated with a transient albuminuria, during the second week as a rule. A **septic nephritis** may develop in these cases with violent toxic symptoms. The most frequent form is the post-scarlatinal nephritis, though in this form the pathologic changes generally occur some days before the symptoms. It usually develops in the third week, occurs either suddenly or gradually; urine is scanty and smoky, and albumin present in quantity, casts of all varieties are found. **Uremia** may develop in the course of the nephritis. **Edema** and **anasarca** are unfavorable symptoms.

The **heart** may show a tachycardia quite early, a mild myocarditis existing in most cases, due to the toxin. **Bronchitis** and **bronchopneumonia** are frequent complications. Severe **nervous**

symptoms may be seen, delirium, meningitis occurring primarily or following mastoid disease. The eyes are involved, a **photophobia**, conjunctivitis, or even a retinal hemorrhage. **Vomiting** is the most frequent initial symptom; a severe **diarrhea** may occur.

FIG. 25.



Scarlatina.

Among the **sequelæ** may be mentioned chronic enlargement of the tonsils, and catarrh of the pharynx and nasopharynx; deafness; mastoiditis; endocarditis; chorea.

Bacteriology.—The specific cause has not been isolated. Cass has described a micrococcus which he believes is the cause, which he describes as a non-capsulated diplococcus. His observations have been corroborated by a number of observers.

Prognosis.—This is very uncertain owing to the complications which may exist later. It is influenced by the age of the patient, social condition, etc.

Treatment.—Prophylaxis.—Isolation and quarantine are most important; isolation for twenty-four hours of those cases in which the diagnosis is uncertain; protection of clothes of nurse and visiting physician; care of nose and its secretions, cloths used for these should be disinfected or destroyed; large airy room, plenty of light, in bed during the attack and for ten days after subsidence of the fever; daily bathing and anointing with an antiseptic ointment at the beginning of desquamation:

℞ Vaselini,
Lanolini, āā ℥ss;
Ac. carbolic., gtt. ix.
M. et ft. ung.
S.—Apply to the desquamating spots.

The diet should be liquid, preferably milk, for two weeks and gradually increased after the fever has subsided; hydrotherapy for the temperature; if there is much restlessness, the following is of benefit:

℞ Liquoris ammonii acetatis, ℥ss;
Spiritus etheris co., ℥ij;
Aquæ destillati, q. s. ℥iv.
M. Sig.—A teaspoonful every 3 hours.

Strychnine for the flagging heart, or digitalis when pulse is weak and compressible; whiskey given with caution because of the kidneys.

The complications should be met promptly.

VARICELLA.

Synonym.—Chickenpox.

Definition.—A specific, eruptive disease, mildly infectious, common to childhood. The exanthem appears in successive crops of vesicles, accompanied with slight fever.

Symptoms.—Divided into the stages of **incubation, prodrome, eruption,** and **desquamation.**

Stage of Incubation.—This varies in duration from one to two weeks or even longer, the average being about twelve days. There are no symptoms common to this period.

Prodromal Stage.—There may be no symptoms referable to this stage other than slight restlessness and perhaps some fever, the first symptoms being the rash.

Eruptive Stage.—The eruption on the neck or back is generally the first evidence of the disease, rapidly appearing on other localities, the characteristic feature of the eruption being the appearance of successive crops, showing the primary vesicle, the scab, and the desquamated spot. The eruption appears as erythematous spots, but slightly raised, which disappear on pressure; they are rose red in color, about a $\frac{1}{4}$-inch in diameter. Very shortly after the appearance of a spot a vesicle forms on its apex, which enlarges to the size of a split pea. It is translucent, and when opened with a needle few or no trabeculæ are found, a diagnostic point from variola. The vesicle dries up or scabs over in twenty-four or forty-eight hours. Coincident with the development of the exanthem the enanthem appears upon the buccal mucous membrane, vagina, and upon the prepuce of boys.

Systemic Symptoms.—There is a rise of temperature, sometimes 3 or 4 degrees, oftentimes but a very slight rise. The child usually presents very few symptoms during this stage, not being deterred from play. It may be restless and cross toward night.

Desquamation.—The stage of desquamation begins with the drying up of the vesicles, and because of the dry state of the skin at this time itching may be severe, and if scratching is allowed, the vesicles may be ruptured and infected.

Complications and Sequelæ of Chickenpox.—Very few complications occur in varicella. Erysipelas may develop after the appearance of the vesicles. Deep ulceration may follow the vesicular stage. Hemorrhage may take place in the vesicles. Pneumonia, pleurisy, synovitis, acute nephritis, have been reported.

Diagnosis.—Corlett gives the following diagnostic points: (*a*) Varicella has very mild prodromal symptoms, and they may be absent altogether. (*b*) The eruption appears on the trunk, where it is more abundant than on the face and hands. (*c*) The multiform character of the eruption, its superficial position, comparable to drops of water sprinkled over the skin, and its appearance on the same region in successive crops. (*d*) Its mild constitutional symptoms and short duration, the disease usually terminating in five to fourteen days. (*e*) It is mildly infectious and always gives rise to the same disease. In adults the diagnosis is often quite difficult.

Prognosis.—Unless severe complications occur it is most rarely fatal.

Treatment.—But little treatment is needed. Baths for temperature; prevent scratching and infection, of the vesicles; and isolation until desquamation is complete.

RUBELLA.

Synonyms.—**German measles; Rotheln.**

Definition.—A specific epidemic disease, characterized by an eruption of a mild nature, tending to an early and complete recovery. It generally occurs but once in the same individual. It may be sporadic. Cause is not known.

Symptoms.—**Incubation.**—From two weeks to eighteen days from infection to development of rash. No symptoms in this period.

Invasion.—Symptoms often not noticed. May be similar to those of varicella, slight languor, headache, etc. There may be some cough and coryza. Just before rash appears there is a slight rise of temperature. This period is generally about twenty-four hours in duration.

Eruption.—Rash appears first on face, then on body, and simultaneously it may be seen on the mucous surfaces. On the skin there is a faint macule, which soon becomes red, and may become confluent, spreading over the whole body in twenty-four to forty-eight hours. Usually when the legs are involved the rash has faded from the face. The eruption resembles that of measles more than that of scarlatina.

One of the most valuable diagnostic signs is the **enlarge-**

ment of the glands of the neck, present when the rash reaches its height, occurring in about 90 per cent. of cases, the post-cervical being most often involved. The temperature-curve does not reach very high, rarely higher than 103° F., generally lower.

Desquamation.—Some areas of the body may show a slight roughening of the skin, during the latter part of the eruptive stage, while other parts contain the rash. Desquamation rarely lasts more than five days or a week.

There are practically no sequelæ or complications; a re-infection or second attack may occur.

Diagnosis from measles especially. In **rubella** the prodromal stage is short and insignificant, and in measles it is accompanied by severe catarrhal symptoms as a rule, and the enanthem is present before the exanthem. The rash of rubella is not so dusky red, spots not well defined and outlined; reaches its maximum early, and begins to fade from the parts where it first made its appearance before all of body is covered; glands of neck are enlarged, temperature not high; has few complications.

Prognosis.—Under ordinary conditions and surroundings the prognosis is invariably favorable.

Treatment.—Quarantine during eruption and desquamation. Avoidance of exposure to cold; diet which is easily digested; and treatment of complications as they arise.

VARIOLA.

Synonym.—Smallpox.

Definition.—This is one of the most contagious of the exanthemata, characterized by its sudden onset, high fever, eruption going through several stages of development, having a stage of incubation, invasion, eruption, and scabbing or desquamation.

Etiology.—The cause is not known, but it is believed to be a specific bacillus, not yet isolated, gaining entrance to the economy through the medium of the mucous membranes. The contagion is carried by means of the air, any article used or touched by the patient, the excreta. It may affect children of all ages. There are several varieties, the **variola vera,** or the natural type, the **hemorrhagic,** and the **irregular** or **modified** form. The true type may present in **confluent** or **discrete** form.

Symptoms.—The period of invasion is about three weeks, the onset of the incubation period being sudden. The average length of the period of invasion is about thirteen days. The incubation period is generally ushered in by a chill, nausea and vomiting, rapid rise of temperature, headache, coated tongue, constipation, more rarely diarrhea, epigastric pain, rapid pulse, short and labored respiration ; there may be convulsions.

The **eruptive stage** usually begins about the third day, though there may be a preliminary rash on the second day, being more an erythematous rash, which may resemble the rash of the other exanthemata, or it may assume in children a purpuric type. Generally on the third day the eruption begins, first on the face, shortly after on the hands, wrists and arms, then on the rest of the body. It is first a small red spot, disappearing on pressure, next papules, the next day, the sixth, being larger and forming vesicles. These are at first small, on the summit of the papule, the whole papule becoming vesicular and filled with serum, which soon becomes opaque. There is a coincident development of the enanthem with the exanthem. In the confluent type the vesicles and pustules are very close, leaving but little healthy skin between.

With the appearance of the eruption the severe initial symptoms abate, there being a decided drop in the temperature, which remains low until the formation of the pustules, being frequently quite high in this stage. During this stage there is often a general edema of the body surface about the eruption.

Stage of **desquamation** begins with the scabbing, about the twelfth day, first upon the face, then the hands following the order of its appearance, and is generally complete before the twenty-fifth day.

The **confluent** form is an aggravation of the mild, the general symptoms and the rash being more severe. During the vesicular stage the vesicles may coalesce forming large individual lesions. In the **hemorrhagic** form there is an extravasation of blood in the vesicles; there may be bleeding and sponginess of gums. This type is very fatal. The **modified** or **irregular** form is generally encountered in individuals previously vaccinated, being termed **varioloid.** It is a mild form of the disease. It is shorter in duration, almost never fatal, but is as contagious as the confluent type.

Complications.—The **skin** may be permanently scarred owing to the deep ulceration present, or there may be a deep discoloration at the point of the macule. The eyes may be affected by a severe conjunctivitis, or even an ulceration and perforation of the cornea. A catarrhal middle-ear inflammation may be present.

Prognosis.—The greatest mortality in persons unvaccinated occurs in children from one to ten or twelve years old. The outlook is worse in women than men, pregnancy being a grave complication; previous health influences the prognosis. Recovery not likely in hemorrhagic type. A mild, light-colored initial or preliminary rash indicates a favorable outcome. Varioloid rarely is fatal.

Treatment.—Prevention is absolute by means of vaccination. This is believed to protect for a period of nine or ten years, though its influence perhaps never entirely ceases, modifying the severity of an attack after its protective power has ended. Revaccination restores protection, to die out again in about the same length of time. Smallpox would be wiped out if vaccination was universally practised. Strict quarantine is of the greatest importance. When patient has been removed from a room, most careful disinfection is imperative with destruction of mattress and of bedding. Formaldehyde is entirely reliable as a disinfectant.

Absolute confinement to bed; calomel purge, careful cleansing of eyes with antiseptic solution; fluid diet; frequent general baths; moist bichloride dressing to pustules; opium for pain; or bromide and chloral if opium is contraindicated.

Competent nursing is the greatest essential. Exclusion of all but the red rays of light is believed to influence amount of pustulation and pitting. The careful opening of all pustules as they mature, followed by the moist dressing, is recommended.

Strychnine and iron are of benefit, given internally. Locally the following may be used:

℞	Acidi carbolici puri liquefacti,	ʒss;
	Zinci oxidi pulveris,	℥j;
	Pulveris lycopodii,	℥j.
M.		(Moore.)

Ichthyol am. sulph. in 30 to 50 per cent. strength is an excellent antiseptic agent. Menthol, resorcin, and carbolic acid solution applied locally are of use for the itching.

VACCINIA.

Definition.—This is an eruptive disease caused by the introduction into the circulation of the smallpox virus, or lymph.

There is great difference of opinion as to the kind of virus to be used, whether the dried bovine virus or the glycerinated lymph, the old arm-to-arm method having long been discontinued. A child with a skin lesion or a sick child should not be vaccinated until the disability is removed. Vaccination should be performed under the strictest aseptic conditions, no antiseptics should be used, the virus should be as nearly sterile as it is possible to make it, and the arm should be protected from injury or infection afterward. The possibility of the latter occurrence should be borne in mind. The point of vaccination undergoes a regular development of the typical vesicle, first the induration and redness, the umbilicated vesicle and the subsidence of all inflammatory signs and formation of the scab. The first signs of a "take" generally appear in about four or five days, drying up in ten or twelve days, the scab falling off in ten days more. The development of the typical scar may be accompanied with a general rash which resembles the primary rash of variola. All persons can be successfully vaccinated once, there being no such thing as a natural immunity.

Erysipelas, tetanus, glandular suppuration, gangrene, and ulceration may follow a vaccination, due in every instance to an infection at the time of inoculation or following it. Impetigo and psoriasis have been found as complications.

DIPHTHERIA.

Definition.—An acute infectious and transmissible disease which is characterized by the production of a false membrane, on a mucous surface or denuded skin, which is due to the Klebs-Löffler bacillus. The general symptoms are due to its toxins.

Etiology.—Diphtheria is due to the Klebs-Löffler bacillus. This organism varies greatly in its appearance according to circumstances connected with its growth, the culture-media, temperature, age of growth, etc. It is rod-shaped, either straight or slightly curved, with a slightly bulbous end. It stains best in methylene-blue or dilute carbol-fuchsin, by Gram's method. It grows best at a temperature between 70° and 100° F. on Löffler's blood-serum. It has no movement and does not liquefy, forms no spores, and is killed at 136° F. A mixed infection frequently occurs; in fact, the diphtheria bacillus is rarely found alone; the most frequently associated organisms are the streptococcus, staphylococcus, pneumococcus, and *Bacillus coli communis.* A mixed infection influences the prognosis greatly, as the toxemia from the other organisms is almost as much to be feared as that from the diphtheria bacillus.

The poison produced by the bacillus is its toxin, the virulence of the toxin being measured by the amount required to kill a guinea-pig weighing 500 grams.

Antitoxin is a serum obtained from a horse into which has been injected a virulent culture of the bacillus prepared in bouillon sufficient in amount to kill 10,000 guinea-pigs weighing 250 grams. These injections are repeated until the horse has been given twenty times the original dose. He is then bled from the jugular vein, the serum being siphoned off after the blood clots.

Park gives the following definition of an antitoxin unit: "That amount of antitoxin which is required to neutralize sufficient toxin to kill 100 small guinea-pigs."

A **pseudobacillus** has been described quite distinct from the Klebs-Löffler bacillus.

Infection.—Cases may occur sporadically or in epidemics. Direct infection may be traced or the organism may be transmitted by clothing, toys, towels, milk, domestic animals, defective sewerage. Few cases occur in children under one year of age, most cases occurring between one and ten years. Adenoids of the pharynx, catarrhal conditions of the nasopharynx, and enlarged tonsils predispose to the disease.

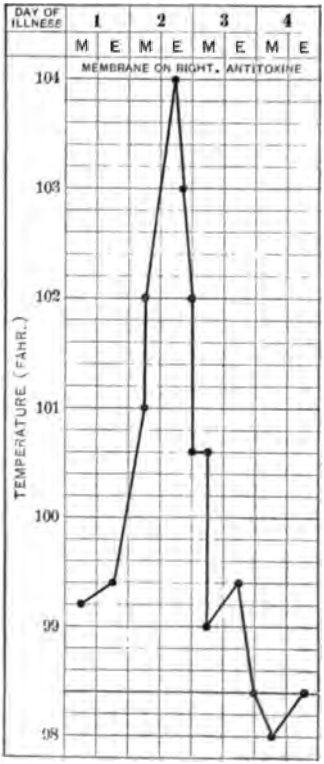
The bacillus has been found in organs remote from the point of pseudomembrane, and is also found in healthy throats.

Pathology.—The pseudomembrane may be found on the tonsil, pharynx, larynx, nose, epiglottis, bronchi, esophagus, vagina, or any abrasion of the skin. It is of a grayish-white color, and adheres firmly to the surface beneath. It is made up mostly of fibrin, leucocytes, and lymphocytes. Mucous membrane beneath is denuded of epithelium.

The **nervous system** is affected by the toxin, there being a degeneration of the peripheral nerves, of the nerves in the cord and brain, in the nerve-cell, and in the muscles, without nerve-involvement. The **muscle-change** is principally in the heart muscle, there being a fatty degeneration. In the **lungs**, bronchopneumonia is one of the most frequent changes, due to the direct action of the bacilli, as well as to the pneumococcus and streptococcus. The **lymphatic glands** are almost uniformly enlarged. The **kidneys** are often involved, showing degeneration-changes in the interstitial tissue and in the glomeruli.

Symptoms.—Diphtheria is classified according to the location of the membrane and the bacteriologic findings. **Fever** is not constant, though present to some extent in all cases; it is higher in mixed infection, depending on toxemia, ranging from 100° to 105° F. The pulse is always accelerated, the rate depending upon the degree of toxemia. A rapid slowing of the pulse after subsidence of acute symptoms is a grave sign. A very rapid **pulse** is a grave sign, about 50 per cent. dying when the pulse reaches 150. A general redness of the **throat** is present before the formation of the membrane, which appears very soon afterward, generally on the tonsils, one or both, or posterior faucial pillars; **cervical glands** are enlarged; there is **dysphagia**; if **nose** is affected—either primarily or secondarily—there is a nasal discharge, which excoriates the skin with which it comes into contact; snuffling; difficulty in nursing; red and swollen mucous membrane, with early appearance of the membrane. If the **larynx** is involved, there may be recognized three stages: invasion, spasmodic stage, and asphyxia. It may be primary, but is generally secondary. Hoarseness following an attack of diphtheria is a grave sign. **Difficulty in breathing** may come on within a few hours after acute symptoms are noted. There are **cough,** hoarse and strident, **dyspnea**; **cyanosis**; **depression** of **spaces** above clavicle, between ribs and above sternum; increase in severity of symptoms is followed by ith. **Asphyxia** is due to either spasm of glottis, the false

FIG. 26.

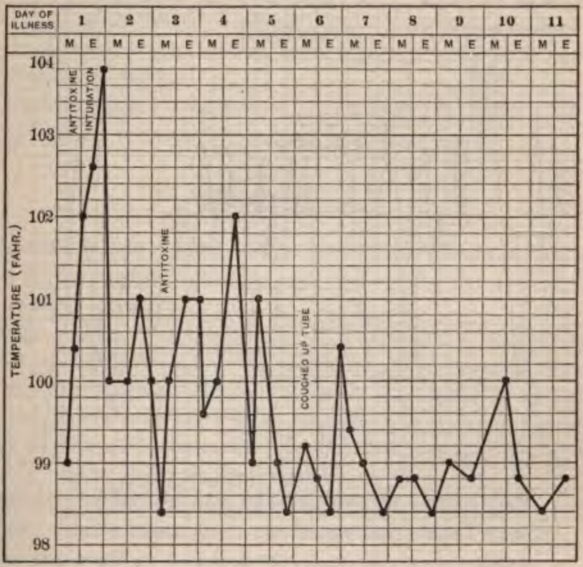


Diphtheria.

membrane, paralysis, carbonic acid poisoning, one or all acting.

Complications and Sequelæ of Diphtheria.—The **tonsils** and **glands** are enlarged in most cases. **Vomiting** is a frequent initial symptom; **albuminuria** occurs in about 35 to 50 per cent. of cases; **endocarditis** and **myocarditis** may occur; **paralysis** from the action of the toxin on the nerves before the antitoxin era was comparatively frequent, found most often of palate, shown by regurgitation of swallowed liquids, recovery taking place in three or four weeks; may involve muscles of larynx, pharynx, eyes, feet, upper extremities, diaphragm, and heart. **Pneumonia,** generally of the broncho type, is frequent.

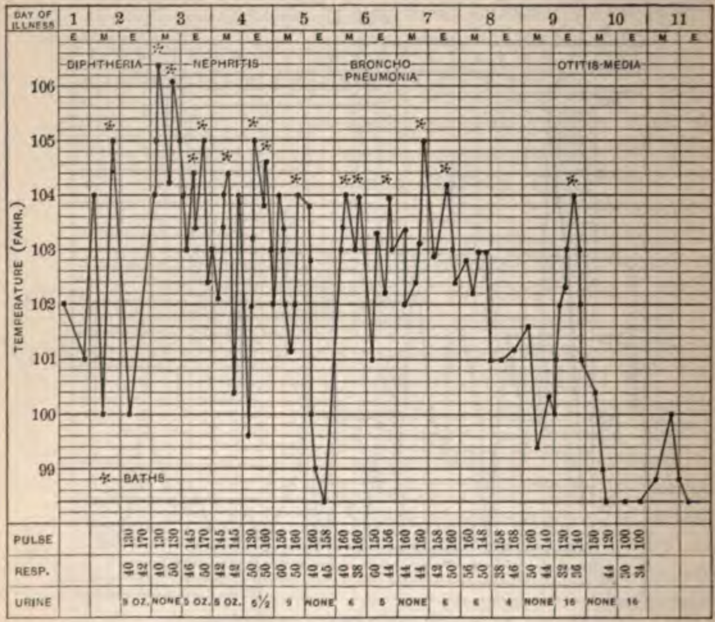
FIG. 27.



Laryngeal diphtheria. Intubation.

Diagnosis.—A routine examination of the throats of all sick children should be made. An early diagnosis is important. Diagnosis where membrane is present is to be made between catarrhal conditions and membrane formed by other organisms; from **quinsy** and **follicular tonsillitis.**

Fig. 28.



Diphtheria. Nephritis. Bronchopneumonia. Otitis media.

Prognosis.—Depends on age of patient, under five years more fatal; **site** of lesion; **if operation needed**; **kind** of treatment; **time** of beginning treatment.

Treatment.—Prophylaxis is of importance, by disinfection and inspection of school-children, immunization by antitoxin. Absolute confinement to **bed**; careful **feeding**—milk is best; using position suggested by Casselberry in intubated cases, head below body; **calomel fumigation**; **mercury and tinct. ferri chloridi** formerly recommended. **Stimulants,** alcohol and strychnine, indicated early—10 to 20 drops of former to child of one year and $\frac{1}{100}$ gr. of strychnine to child of same age; **sedatives** if needed, morphine or Dover's powder; and **locally** hydrogen dioxide diluted to fauces by mop and nasal irrigation, never using force.

Specific treatment is with **antitoxin.** Dose influenced by severity of symptoms, age, toxemia, etc., 2000 to 3000 units for initial dose to child of a year, and in laryngeal cases 3000 to 5000. Concentrated serum best, injected into back or thigh after careful antisepsis.

Tracheotomy and **intubation** in suffocative cases, the first only used when intubation is contraindicated.

ERYSIPELAS.

Definition.—This is an acute contagious disease in which there is a red rash of the skin, spreading rapidly, with severe constitutional symptoms.

Etiology.—The streptococcus of Fehleisen is the specific organism, gaining entrance through an abrasion of the skin or mucous membrane, which may be microscopic in character. Immunity is not conferred by one attack. It is especially liable to develop in the newborn, infection occurring through the navel. May complicate varicella.

Pathology.—The skin and connective tissue are severely inflamed. There are great swelling, heat, and redness, due to the inflammatory process, with rapid involvement of new areas.

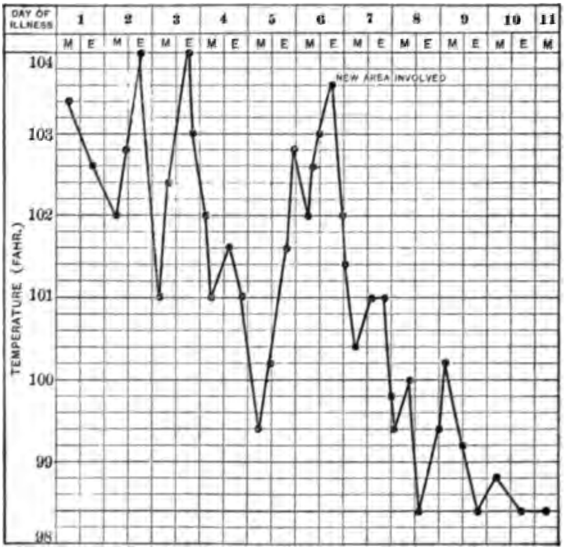
Systemic Symptoms.—There is a very short incubation period with quite a sudden onset, ushered in by a chill followed quickly by fever, prostration, headache, etc. The temperature is high, 104° to 105° F., with slight intermission.

Focal Symptoms.—The rash is of a dark-red color; the affected skin swollen with distinct line of demarcation. The rash may be seen to spread from day to day. It may last several days or a week, the constitutional symptoms remaining unabated until new areas are no longer involved.

Prognosis is very grave in young infants and children, but much better in older children.

Treatment.—Rest and quiet, isolation, careful feeding and active stimulation, with an internal remedy to counteract the effect of the toxins, are the indications. To meet the latter, the tincture of the chloride of iron may be used. Hydrotherapy for temperature, and to stop the spread of the lesion painting the surface affected with pure carbolic acid and this washed off with pure alcohol as soon as surface begins to turn white. This may be followed by the application of a 10 to 15 per cent. ichthyol ointment.

Fig. 29.



Erysipelas.

℞	Acidi carbolici,	
	Tr. iodin.,	
	Alcoholis,	āā f℥j;
	Olei terebinthinæ,	f℥ij;
	Glycerini,	f℥iij.

M. et ft. solutio.

Sig.—Apply with brush and cover with aseptic gauze.

PERTUSSIS.

Synonym.—Whooping-cough.

Etiology.—Pertussis is due to some infectious organism which has not yet been isolated, its habitat being the nose and the larynx. Children are especially liable to develop it, one attack usually producing immunity, though this is not necessarily so. It is endemic or epidemic. No age is exempt, though it is unusual during the first six or eight weeks.

Pathology.—There is an inflammatory condition of the larynx, and frequently of the rest of the respiratory mucous membrane. The most frequent complicating conditions are bronchitis and bronchopneumonia.

Incubation is generally about two weeks or more.

Symptoms.—There is usually a mild catarrh of the larynx and trachea preceding, which may cause considerable coughing, but there is no tendency to improve. Any cough, then, with practically no abnormal sounds in the chest and persisting for two or three weeks without the characteristic **whoop,** is very suspicious indeed. Following a period of cough without whooping, the cough is paroxysmal and assumes the characteristic sound, each cough harder, until the child loses its breath. The paroxysms are followed by a long-drawn, deep inspiration, which is the characteristic whoop; the child's eyes are full of tears, the skin is bluish, and the patient generally falls back exhausted when the paroxysm is over. If old enough to be around, the child braces itself against a fixed object with head forward, in which position it may vomit, ridding the bronchi of accumulated mucus, and frequently the stomach of its contents. As many as one severe paroxysm each hour may occur. It is brought on by exercise, laughing, crying, eating, and any excitement. More paroxysms occur at night than during the day as a rule. Even after entire subsidence of the paroxysms, any slight cough from a mild bronchitis will be accompanied by a whoop. The child's general health suffers because of interference with its sleep, loss of appetite, and the frequent vomiting which occurs.

Complications.—The most frequent is a bronchopneumonia. Hemorrhages from nose and mouth into the conjunctiva and into the brain may occur. Hernia may develop.

Diagnosis is not easy in the early stages, frequently the mother or nurse making the diagnosis before seen by the physician. If there is a history of exposure, the diagnosis is more readily made.

Prognosis in young children is not good because of the danger of complications, especially bronchopneumonia. In older children it is not so grave.

Treatment.—Quarantine from other children. The child should not be allowed to see others without they have had whooping-cough. If much vomiting occurs, the child must be kept up on concentrated foods or predigested milk. Fresh air is most essential.

Inhalations of the vapor from the vapocresoline lamp is believed by some to be of great service, but in some children it is not of the least benefit, and cases of carbolic acid poisoning have been reported from its use.

Internally a number of drugs have been recommended. **Antipyrin** is probably the best remedy; given ½ grain for each year of the patient's age. **Bromoform** in 2-drop doses four times a day, the nurse being warned that the last three or four teaspoonfuls in the bottle must not be given, as they contain a decidedly larger percentage of the bromoform than the upper portion because of the high specific gravity of the remedy. **Belladonna** in increasing doses is of service.

℞ Antipyrin,	
Quininæ sulphatis,	āā ʒss;
Elix. glycyrrhizæ,	f℥iv.

M. et ft. solutio.
Sig.—Teaspoonful every two to four hours.

℞ Ammon. bromidi,	
Potassii bromidi,	āā ʒj;
Tr. belladonnæ,	fʒj;
Glycerini,	f℥j;
Aquæ rosæ,	f℥iv.

M. et ft. solutio.
Sig.—Use as a spray from four to six times a day.

MUMPS.

Synonyms.—Infectious parotitis; Parotiditis.

Etiology.—Exact organism not known. Disease is very contagious. Immunity is conferred by one attack.

Pathology.—One or both parotid glands may be involved. Suppuration practically never occurs. The period of incubation is usually from two to three weeks.

Systemic symptoms are fever, headache, anorexia, pain on swallowing, salivation, perhaps nausea and vomiting. Temperature may go to 101° to 103° F.

Focal Symptoms.—At the same time there is an enlargement of the parotid glands, one or both, with later enlargement of the submaxillary glands. The duration is about two or three weeks.

Complications.—In adults there may be a metastasis in the testicle, or into the breasts or ovaries of an adult woman.

Prognosis is excellent, but few children other than those very much prostrated from debilitated conditions suffer inconvenience.

Treatment.—Keep the child in the house and warm in winter; protect the glands with a piece of flannel passing under the chin and pinned on top of the head. Liquid diet. Small doses of calomel should be given at the beginning of the treatment.

QUESTIONS.

What are the acute exanthemata?

Define measles and give the synonyms.

Into how many stages are the symptoms divided?

Give the symptoms of the stages of incubation, invasion, eruption, and desquamation.

Describe a few atypical cases. What complications may occur?

Into what stages is the treatment of measles divided? Give the treatment of each stage.

Define scarlatina.

Define the stages of its development and describe the clinical forms.

What role do bacteria occupy in its causation?

What complications and sequelæ are encountered?

How is the disease best prevented?

Give the curative treatment.

In what does varicella differ from the other exanthemata?

Name the stages and symptoms of each.

Describe the skin lesions in detail from their commencement. How treated?

Describe rubella and give the symptoms and diagnosis. How treated?

Describe the periods of incubation, eruption, and desquamation.

Give the clinical types.

What complications may be present? How treated?

Define variola and name its stages.

Give the symptomatology of each.

Describe the eruption.

How many clinical types?

How is it treated?

What is vaccinia?

Describe in detail the operation of vaccination.

Describe a typical "take."

What organism causes diphtheria?

Describe the modes of infection, and the organism.

What are the symptoms and how classified.

What complications exist?

What preventive treatment is effectual?

How is antitoxin administered and in what doses?

Define erysipelas and what organism is the cause?

What are the focal and systemic symptoms.

Give the prognosis and treatment.

What is the proper name of whooping-cough?

Give the etiology and known pathology.

What symptoms present? How diagnosed? What complications occur?

How are the complications of pertussis best prevented and treated?

What is parotitis?

What gland is involved? How diagnosed?

What complications may occur?

Give the symptoms, prognosis, and treatment.

CHAPTER XX.

DISEASES OF THE RESPIRATORY SYSTEM.

DISEASES OF THE NOSE AND THROAT.

ACUTE RHINITIS.

Synonyms.—Coryza; Acute nasal catarrh.

A very frequent condition in childhood, and of importance because of the nature of the structure of the nose and throat and nearby organs, which may become inflamed.

Predisposing and Exciting Etiologic Factors.—Under the former may be mentioned a disordered condition of the functions of the body; an inherited diathesis; a deformity of the nose from injury, or a congenital one; adenoids in the nasopharynx. Exposure is the most frequent of exciting factors, by causing a temporary cessation of the skin functions and greater work thrown upon the mucous membranes of the air-passages. Pathogenic organisms certainly play a part in the etiology.

Pathology.—The mucous membrane of the lower portion of the nose is much swollen and congested, which condition may extend to the nasopharynx, Eustachian tubes, or larynx. There is at first a watery discharge, soon changing to a mucopurulent discharge, in which there are both red and white blood-cells.

Systemic Symptoms.—There may be a malaise with a slight rigor, accompanied by sneezing; a rise of temperature of one or two degrees follows.

Focal Symptoms.—There is soon difficulty in breathing, followed by a discharge from the nose as above described. There may be an excoriation of the upper lip as the result of the irritating properties of the discharge. If in a nursling, there is great difficulty in breathing while at the breast. Constant crying, rise in temperature, and restlessness point to involvement of the middle ear. Neighboring glands may be swollen and tender. The duration is usually three or four days.

Treatment.—An initial purgative is always of benefit; calomel in small doses, followed by a saline if possible, or cascara sagrada aromatic; confinement to one room; protection from draughts. If there seems much pain in a child of five or six years, who can tell of his discomfort, phenacetin in small doses is very effectual. If possible, an alkaline spray to the nose or a douche of boric acid solution, or an oily spray of benzoinated albolene gives good results.

To prevent recurrence, the cold douche bath to the spine every morning to those children who can stand it is of benefit. If the child is much run down, tonics are of service, syrup of the iodide of iron, etc.

CHRONIC RHINITIS.

Etiology.—Nearly always a result of repeated attacks of acute rhinitis; adenoids; nasal polypi; rhachitis, and other conditions caused by impaired nutrition.

Pathology.—There is a more or less permanent thickening of the mucous membranes, a purulent discharge, perhaps minute ulcers in the mucous membrane; there is ozena in neglected cases.

Symptoms.—These are mostly local, a chronic discharge from the nose, incrustations at the alæ nasi and in the passages, irritability of disposition. There may be a very disagreeable odor from the pus which forms. There is an accumulation in the nasopharynx also which materially interferes with respiration. (See Fig. 30.)

Treatment.—The child should be placed on a tonic treatment, to tone up the general health; careful examination should be made for the presence of foreign growths in the nose and nasopharynx. A cleansing douche of boric acid or Seiler's solution, 1 tablet to 3 ounces of warm water, should be used frequently. The nose and lip should be greased at night with zinc oxide ointment to prevent crusting of the secretion.

EPISTAXIS.

Definition.—This is a hemorrhage from the nose, a comparatively frequent occurrence among children, coming as a rule from the anterior nares.

Etiology.—In children it is generally traumatic, but may result from ulcers, angiomatous tumors, etc. In general conditions as scurvy, typhoid fever, hemophilia, it may be seen. It may be present at puberty as a vicarious menstruation.

Symptoms.—The principal symptom is the hemorrhage, generally from the anterior nares or from the posterior nares, with the symptoms of anemia when loss of blood is excessive.

Treatment.—In most cases the hemorrhage ceases without treatment. It is either local or general, or both, according to the severity of the case and its cause. In persistent hemorrhage a local examination should be made of the nose and a styptic solution applied to the bleeding spot—either Monsel's solution or the perchloride of iron. Ice, compression of the alæ, hot or cold injections with or without lemon-juice, gelatin injected after thorough cleansing, or if these measures fail plugging of the nose is necessary.

NASAL POLYPI.

These growths occur not infrequently in older children, but rarely in infants. They are often overlooked.

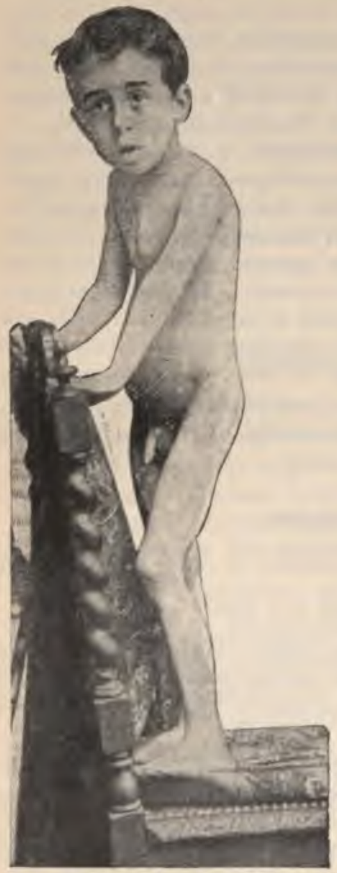
Pathology.—They are generally located on the middle turbinate bone, hanging by a pedicle, often varying in size, made larger by congestion of the nasal mucous membrane following exposure. They may be myxomata or fibromata; cystic; lipomata; papillomata.

Symptoms.—There are symptoms of chronic rhinitis with discharge from nose, which may be offensive from decomposition of pent-up secretions. There may be a disturbance of sense of smell, headache, restlessness at night, mouth-breathing, perhaps pain in ear. The nose should be carefully inspected.

Treatment is generally surgical, and should be performed early. This may be accomplished by excision, evulsion by snare or forceps; cauterizing agents; local injection.

ADENOID VEGETATIONS.

FIG. 30.



A boy, aged four years and nine months, suffering from adenoid vegetations of the nasopharynx, showing the characteristic expression, attitude, and deformities of the chest. (From a photograph in the *possession* of Dr. St. Clair Thomson.)

Synonyms. — Hypertrophy of Luschka's tonsil; Third tonsil; Lymphoid papillomata.

A comparatively frequent growth in children; variously estimated, but probably about 2 per cent. of all throat and nose cases present some adenoids.

Etiology.—Age is a predisposing factor, adenoids occurring most frequently between two and fifteen years, more in the latter half of this period than the first. Probably more frequently found in girls; heredity may be a contributing cause; rhachitis and poor nourishment; the exanthemata; chronic nasal catarrh.

Pathology.—The growths are composed of lymphoid tissue, similar to if not identical with the tonsils; and are an exaggerated growth of the normal tissue of this region; the vegetations assume various shapes, generally forming grape-like masses, of sufficient size often to obstruct the nasopharynx completely.

Symptoms.—There is an obstruction to nasal breathing, child "catches cold" easily; is a **mouth-breather;**

snores in its sleep, is quite restless, due to the obstructed respiration and the preponderance of venous blood in the brain; soon there is a change in the shape of the face; the nose has a pinched look; deafness is present, and perhaps pain in the ear from interference with the Eustachian tube; spasmodic croup may occur. (See Fig. 30.)

The **diagnosis** often is impossible except by a digital exploration of the vault of the pharynx.

Treatment.—The one indication which must be met is the removal of the obstruction, which may be accomplished with Gottstein curette, post-nasal forceps, and finger. The patient, unless an older child, should be anesthetized with ether, chloroform, nitrous oxide gas, or a combination of gas and ether; on a table, head lower than body, mouth-gag in position. The growth is then thoroughly removed. Hemorrhage is usually considerable, but not as a rule alarming. Post-nasal douching with an antiseptic solution is advisable afterward.

UVULITIS.

Synonym.—Elongated uvula.

This **rarely occurs** as a primary lesion, being associated as a rule with an acute pharyngitis or tonsillitis.

Symptoms.—There is an uncomfortable sensation in the throat; an irritable, hacking cough, worse on lying down; perhaps pain on swallowing. There are no signs in the chest unless there has followed an asthma or there are transmitted sounds from the larynx.

Treatment.—Local application of an astringent will often be all that is required:

℞	Ac. tannici,	ʒss;
	Glycerini,	ʒij;
	Listerine,	
	Aquæ dest.,	āā ℥iij.

M. et ft. solutio.
Sig.—Apply to uvula with a camel-hair brush.

If the child is old enough, a simple alkaline gargle should be used. If the uvula becomes chronically enlarged, it should be clipped, care being taken to remove only the tip, not cutting the muscle. Ice held in the mouth after this operation gives much relief from the pain.

DISEASES OF THE LUNGS.

The **shape of the infant chest differs** somewhat from that of the adult, being more cylindrical. The chest-walls are more elastic because of the predominance of cartilage in the ribs and sternum, and because of this the chest is more readily deformed, as in rickets. The thinness of the chest-walls makes percussion of little avail as a means of physical diagnosis. Respiration is diaphragmatic mostly. Respiratory murmur is puerile, harsh, and high-pitched.

ACUTE BRONCHITIS.

Synonym.—Acute catarrhal bronchitis.

Definition.—A very common condition in young children, an inflammation of the mucous membrane of the bronchi.

Etiology.—It is either **primary** or **secondary.** When primary, it is generally due to exposure, superinduced, perhaps, by a slight indisposition from other causes, as intestinal derangements, wet feet, sudden atmospheric changes without sufficient protection of the body. It may be secondary to a simple coryza, nasopharyngitis, the exanthemata, pertussis, diphtheria, or any of the diseases of malnutrition. Micro-organisms play an important part in its causation.

Pathology.—There is an inflammation of the mucous membrane of the bronchi, usually bilateral, and only the larger bronchi are involved. When the smaller capillary tubes are involved, the inflammation extends through to the surrounding tissue, comprising a bronchopneumonia. There is a profuse secretion of mucus and mucopus.

Symptoms.—The symptoms are gradual in onset, probably *preceded by a coryza*, malaise, some fever. The child is restless, coughs more or less frequently, raises mucus which is swallowed at once. The temperature is slightly elevated, anorexia, may be vomiting if much mucus is swallowed.

In the severe cases all the symptoms are of a more severe nature, generally following the simple form. There is cough, which may be quite severe, dyspnea, difficulty in nursing, cyanosis, fever to 103° or 104° F. Respirations are rapid and there is dilatation of the alæ nasi.

Physical Signs.—In the **first stage** there are **sonorous** and **sibilant rales,** according to the size of the tubes involved, which is soon followed by **moist rales** when the secretion begins, the kind of râle depending on the size of the tubes involved. They may disappear in one area upon coughing. There is a fremitus produced by the large mucous rales.

Diagnosis is especially from **bronchopneumonia,** which may not be possible clinically, or from the physical signs. A localized bronchitis is a very suggestive condition.

Prognosis.—Good in primary cases if child is in fair general condition, as pneumonia is less apt to develop. In secondary type and in delicate children the prognosis is not so good.

Treatment.—Keep patient in one room; plenty of fresh air, made moist by vaporizing an antiseptic solution in the sick-room. Keep quiet in bed, and give as little internal medication as possible. A preliminary purge is indicated. If the cough is severe, good results may be had by the use of the following pill:

℞ Tartar emetic,
Powder of ipecac, āā gr. $\frac{1}{100}$.
Pil. No. 1.

These may be given every two hours unless vomiting occurs. Dover's powder in small doses may be given if cough is very severe. Emetics are not well borne. The best results are obtained by **counterirritation** of the chest, mustard plaster being the best. It helps to allay restlessness and eases the cough. The mustard plaster should be repeated as often as the skin will allow, every four or six hours. **Mustard-baths** are of great service.

CHRONIC BRONCHITIS.

Synonym.—Chronic catarrhal bronchitis.

Etiology.—More common in adults than in children; occurs in those constitutional diseases in which the general system is below par, as rhachitis, syphilis, tuberculosis, congenital heart lesions, causing a passive congestion, or it may follow repeated attacks of acute bronchitis.

Pathology.—The mucous membrane is chronically thickened and congested, the large and small tubes being filled with mucus.

Symptoms.—There is a general pallor; respiration is hurried; the child shows no tendency to exertion; cough is present to a marked degree at times; often paroxysmal; slight rise in temperature; pulse accelerated, especially after coughing.

Physical Signs.—On auscultation there may be large and small moist and dry râles, sonorous and sibilant, mucous and submucous; on percussion increased resonance, due to emphysematous spots in the lung.

Diagnosis.—This may be difficult to make from **tuberculosis.** Wasting is apt to be faster in the latter.

Prognosis.—Is not very good in the run-down and debilitated; at least it should be guarded, as any exacerbation may result seriously.

Treatment.—The best thing to be done is a change in climate, if this can be obtained, to a warmer and more equable one; these patients should be kept out of doors and have as much fresh air and good food as possible. Internally codliver oil probably gives the best results, in combination with wine or syrup of hypophosphites, with or without iron.

BRONCHIECTASIS AND EMPHYSEMA.

Definition.—Bronchiectasis is essentially a dilatation of the bronchioles and emphysema of the air-vesicles. This condition is not uncommon in those lesions of the lung in children which cause a great amount of straining and coughing.

Etiology.—It is most frequently seen in whooping-cough and in chronic bronchitis as a complication, or in frequent attacks of acute bronchitis, the effort at coughing causing a dilatation of the bronchi.

Pathology.—The changes seen are principally in the air-vesicles, the **vesicular** type of emphysema, though the bronchioles are also dilated; the vesicle-walls are thinned and in some cases ruptured, due to the softening attending inflammatory changes.

Symptoms and Physical Signs.—This condition should be suspected in all cases of chronic bronchitis, especially when there is noted a change in the contour of the chest. The chest is thin, the shoulders drooping, chest barrel-shaped, enlarged superficial veins of the skin. There is a great deal of expectoration, especially on awakening, sufficient to nauseate the child and cause it to vomit. There are mucous râles, large and small, an exaggerated pulmonary resonance, and lessened fremitus.

Treatment.—Diminish the cough as much as possible, using codein. sulph. (grain $\frac{1}{12}$ to child of two years, and repeated for effect); general tonics; change of climate when possible. Surgery has been recommended—a pneumonotomy—but has not met with encouraging results.

BRONCHOPNEUMONIA.

Synonyms.—Lobular pneumonia; Catarrhal pneumonia; Capillary bronchitis.

Definition.—An inflammation of the bronchial tubes with an extension to the peribronchial tissue and air-vesicles.

Etiology.—This is essentially a secondary condition of the lung, following a bronchitis, or complicating diphtheria, pertussis, or the exanthemata. It may follow exposure. Micro-organisms are always present.

Pathology.—The mucous membrane of the bronchial tubes is inflamed and swollen, with a diapedesis into the peribronchial tissue; the air-cells are involved with an enlargement of the small vessels about the infundibuli. A small portion of a lobe may be involved in one or both lungs; atelectasis is frequently present also, and areas of emphysema may also be found. On section the area is dark and hard, with oozing of mucus and serum from severed bronchi.

Symptoms.—If a secondary condition, there is a rise of temperature, respiration is hurried, and pulse more rapid. Fever may reach 103° or 104° F., and run an irregular course; respiration may reach 50 to 80, and pulse quite rapid; alæ nasi dilate, cyanosis is present to some extent; the characteristic expiratory grunt is present; there is a dry, irritating cough; there are often marked nervous symptoms; restlessness, especially; there is often severe prostration.

Physical Signs.—There is recession of the supraclavicular and infraclavicular spaces, the intercostal spaces, and dilatation of the alæ nasi. The **respirations** are hurried and shallow. **Percussion** may give an exaggerated resonance over portions of the lung, and dulness may be found over consolidated areas, though percussion, because of the thin chest-walls, is not a very reliable method of physical diagnosis. Large and small râles, mostly moist, are heard on auscultation, and generally localized over one portion of the lung. Any localization of râles, even without serious general symptoms, should be considered of serious import. If a more or less general bronchitis is present also, there may be diffuse râles heard. **Rhonchial fremitus** may be felt with the hand against the chest-wall.

Diagnosis.—When the chief features of this disease are borne in mind, the diagnosis should be easy; complicating other conditions; gradual onset; irregular fever; cough; prostration; characteristic signs in chest.

Prognosis.—A guarded prognosis should always be given; the mortality-rate is considerably higher than 60 per cent. in the secondary cases. The younger the child the less hope. A large area of involvement indicates a prognosis more grave.

Treatment.—Most careful nursing; judicious feeding; stimulation; regular evacuations; moist air; counterirritation with mustard and turpentine or camphorated oil over affected rea; hydrotherapy for temperature; tonics in convalescence.

CHRONIC BRONCHOPNEUMONIA.

Synonyms.—Interstitial pneumonia; Fibroid phthisis.

This condition is **often not diagnosed** except at the autopsy table. It always follows an acute bronchopneumonia and usually only in the much run-down. It is not common in childhood.

Pathology.—The changes are largely those of acute bronchopneumonia, with a large increase of connective tissue in the affected lung. The pleura is generally adherent over a limited area; a bronchiectasis may be present, or in some parts a collapsed area may be found. The bronchi are filled with secretions. Tuberculous processes may involve the consolidated area. Bronchial glands are enlarged.

Symptoms.—A bronchopneumonia running into a chronic state ends in this type; none of the symptoms are ameliorated; there is progressive loss of strength, sleep, and appetite; emaciation is rapid, with occasional exacerbation of the pulmonary signs.

Prognosis for ultimate recovery is not good, though the child may live for several months, either finally recovering or developing a tuberculosis.

Treatment.—Prophylaxis against pulmonary trouble, by warm clothing, warm house, change of climate, regular feeding. As a tonic codliver oil is the remedy *par excellence.*

LOBAR PNEUMONIA.

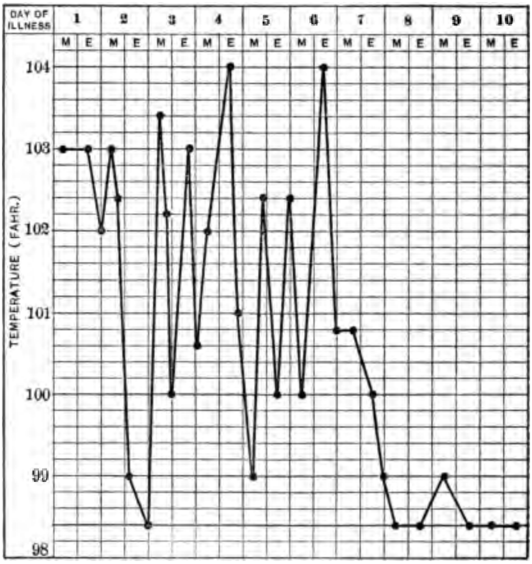
Synonyms.—Fibrinous pneumonia; Croupous pneumonia; Lung fever.

Etiology.—A disease common to childhood over three years of age, caused by the pneumococcus of Friedländer or **Diplococcus pneumoniæ.** It is often epidemic, slightly more prevalent in spring; exposure is often a predisposing cause.

Pathology.—There are four stages: stage of **congestion**; **choking** of air-cells with products of inflammation, thickening of walls; stage of **red hepatization**; softening of the **gray hepatization**; exudate and stage of **resolution,** removal of the exudate by coughing, expectoration, and absorption.

Symptoms and Course.—Sudden onset; chill or rigor; pain in chest; cough and rapid rise in temperature, to 103° or 104° F.; rapid respiration; expiratory grunt; dilatation of alæ nasi; prostration; flushed cheeks. Vomiting may occur at onset. If expectoration is seen, which is infrequent in children, it is of viscid, tenacious character, and tinged with blood. Duration is from four to ten days, and termination is usually by **crisis**, a sudden fall, with or without a collapse following, followed by a temporary rise in temperature. Urine is dark and concentrated.

FIG. 31.



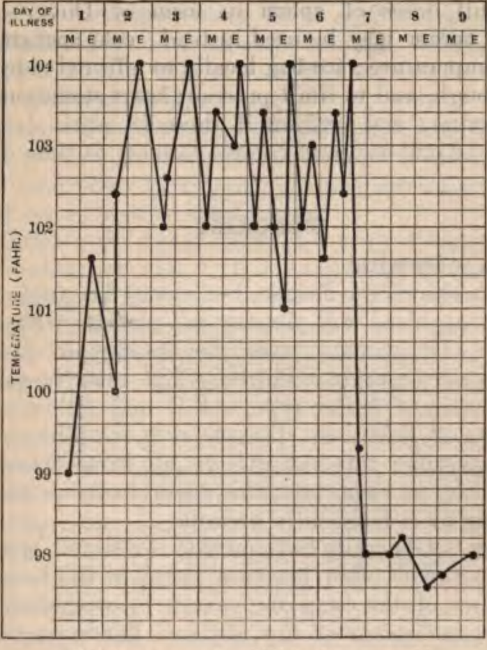
Lobar pneumonia, girl, seven years.

Physical Signs—First Stage.—The pathognomonic sign, **crepitant rale,** is not often heard, as the patient rarely is seen sufficiently early; there is diminished respiratory murmur. **Second Stage.**—Dulness; bronchial breathing; bronchophony;

exaggerated breathing over rest of lung. **Third and Fourth Stages.**—Diminishing bronchial breathing, return of crepitant râle, **rale redux** and large mucous râles; diminished dulness.

Varieties.—Different forms are described according to predominating symptoms. **Abortive,** of very short duration, ending by crisis; **relapsing,** with apparent convalescence and reinvolvement of lung; **cerebral** where brain symptoms are marked, and supposed to be more likely to occur when apex is affected; **pleuropneumonia,** where there is quite pronounced involvement of pleura; **typhoid,** where patient is in a low or typhoid state.

FIG. 32.



Lobar pneumonia, child twelve years old.

Prognosis is almost uniformly good except in run-down and debilitated children, or where severe complications exist.

Complications.—The following complications may be met: **pleurisy**; **nephritis**; **meningitis**; **gangrene** of the lung; **pericarditis**; **endocarditis.**

Treatment.—No set rule of treatment can be laid down, cases vary so greatly. Absolute rest in bed; for pain and cough, small doses of **opium** in form of Dover's powder; **codeine** or **heroin** may be used instead; **cold sponging** or tub-bath for temperature; **ice-bag** locally to affected side of chest; for pain, cough, and to limit process; **heart stimulants,** alcohol and strychnine; and oxygen if there is much dyspnea and cyanosis. Liquid diet and careful nursing at time of crisis.

PLEURISY.

Synonym.—**Pleuritis.**

Usually a secondary disease, but it may be primary. Two forms are recognized, **dry pleurisy** and **pleurisy with effusion.**

Etiology.—In primary cases the etiology is obscure, this form being very rare in children. The most frequent cause is a pneumonia of either type, but it may follow any of the exanthemata or infectious diseases as a complication; tuberculosis; exposure; traumatisms; in all these causes the rôle of the bacteria is important, the staphylococcus and streptococcus being most frequently present.

Pathology.—Generally but one side is affected, the left most often; the exudate often becomes purulent in character. In inflammations of the lung the pleura is congested with loss of its lustre, adhesions of fine fibrinous bands are thrown out over the visceral layer extending to the costal pleura. This is **pleurisy sicca,** or there may be effusion quite early. Dense adhesions may form binding the lung down to the chest-wall. Fibrinous exudates may be thrown out, the exudate being organized into connective tissue, especially in the tuberculous form.

Symptoms.—If acute in its onset, there is generally a chill; in older children, acute, sharp pain in the side; may be cerebral symptoms; high fever; rapid pulse; dyspnea and jerky breathing; irritating cough; pallor. In the more insidious type the fever is not so high, the pain is less and without a systematic examination of the chest might pass unrecognized.

Physical Signs.—Inspection.—Lessened movement of the affected side; bulging when effusion is present, and displacement of the heart.

Palpation.—If **pleurisy sicca,** there may be friction fremitus felt; in **effusion** there is an absence of vocal fremitus and friction fremitus as well, but an exaggerated fremitus above the effusion over the compressed lung.

Percussion.—Dulness over the affected area, due to the thickened pleura; marked flatness over the area of fluid, a pathognomonic sign; increased resonance over unaffected lung because of compensatory emphysema.

Auscultation.—If heard early in both forms, there will be a friction-sound due to the roughened layers of pleura rubbing together; as soon as the layers of pleura are separated by the fluid there is an absence of all signs; there may be increased breathing and perhaps bronchial breathing over the compressed lung at the level or slightly below the level of the fluid.

Diagnosis.—Lack of movement of affected side, friction fremitus and dry friction-sounds, flatness over fluid, and bronchial breathing above level of fluid, aspiration and obtaining fluid are diagnostic signs.

Treatment.—In the early stages when the pain is great, it may be necessary to give an opiate, Dover's powder or paregoric; hydrotherapy for temperature above 102.5° F.; counterirritation with mustard, **not to blister,** gives excellent results in lessening the pain and the amount of effusion. If fluid is demonstrated as not purulent in character, nature may absorb it; aspiration should be done only in cases in which there is dyspnea or marked circulatory changes due to displacement of the heart, and then most carefully performed, as to asepsis, amount of fluid withdrawn, etc. If pus is present, incision or rib resection is the only course to follow. When nonoperative steps are taken, the fluid is absorbed more readily if eliminatives—digitalis, salines, and diuretics—are administered. Calomel gives good results. After recovery the child should be guarded most carefully against exposure, and put upon a tonic treatment, of which the syrup of the iodide of iron is probably the best.

℞	Spiritus ætheris nitrosi,		gtt. xx ;
	Liquoris ammon. acetat.,		fʒss ;
	Chloroformi,		gtt. ij ;
	Aq. menthæ. vir.,	q. s. ad	ʒj.
M.			

Sig.—One dose every two hours. (Febrifuge for child of four years.)

ASTHMA.

Definition.—This is a paroxysmal dyspnea in which there are great difficulty in inspiration and a greater difficulty in expiration. It is essentially a neurosis.

Etiology.—Heredity plays a part in its causation; nervous children specially are liable to its development. There is a **vulnerable area of mucous membrane,** an **abnormally sensitive nerve-centre** and an **irritant,** without this trinity asthma cannot occur. If the sensitive mucous membrane is the bronchial membrane, it is called **bronchitic** asthma; if the stomach, it is called **peptic** asthma, etc. Predisposing causes are nasal and nasopharyngeal disease, etc.

Pathology.—The trinity named above, an abnormally sensitive **nerve-centre,** and **vulnerable area of mucous membrane,** and **external irritant.** After numerous attacks there is a chronic bronchitis, perhaps a dilated heart.

Symptoms.—The attack is sudden, often at night, without warning; sensation of smothering; the extraordinary muscles of respiration are brought into play, the expression is a combined one of anxiety and fear; alæ nasi are dilated; there is a cough; pulse is small and rapid. As the attack subsides the respiration becomes normal, but the cough continues with expectoration of viscid mucus.

Physical Signs.—The chest is commonly called the musicbox chest; the sounds are so many and so varied, principally large and small, loud, dry râles, later as the attack subsides changing to mucous râles. There is hyperresonance because of the difficulty in expiration and dilatation of the air-vesicles.

Prognosis is generally good as to ultimate recovery in the young.

Treatment.—Paroxysmal and during the interval. Children dislike inhalations for the relief of attack, and it is generally necessary to give a hypodermatic of morphine, $\frac{1}{12}$ grain to a child of five years of age, to cut short the attack. In the interval look carefully for the cause and remove it if possible. Potassium iodide in increasing doses is of benefit.

HAY FEVER.

Synonyms.—Rose cold; Autumnal fever; Vasomotor rhinitis.

A neurosis much like the disease just described, asthma.

Etiology.—Believed to be the result of irritating substances deposited upon the very sensitive mucous membrane of the nose. There is believed by some to be a causal relation between uric acid in the blood and hay fever.

Pathology.—Mucous membranes of nose, eyes, and throat are swollen and red, with profuse discharge. May be deflections of nasal septum.

Symptoms.—The disease is usually ushered in by sneezing, which may be very violent and paroxysmal; generally prevalent in summer, and a peculiarity is that it usually begins at the same time every year. There are some pain in the face and much prostration with some fever. Duration is six weeks to three months.

Treatment.—Remove the cause if possible. Handkerchief held over the nose when in presence of dust; treat local abnormalities of nose; sprays to mucous membrane of nose; change of climate if that is possible before the attack is due. Adrenalin solution in spray or locally applied on swab has been recommended of late.

GANGRENE OF THE LUNG.

A **rather rare** condition in children.

Etiology.—There is always an antecedent condition of the lung favoring local necrosis and growth of pus-producing organisms.

Pathology.—Generally a localized process at first gradually spreading; areas are dark greenish in color, and very foul smelling; there is a zone of inflammation around the spot; this spot may soften and break into a bronchus, and be thrown off in this way. If close to the pleura, it may invade this cavity.

Symptoms.—There is always the antecedent condition of the lung—with **increasing prostration, foul breath,** and **expectoration** of **foul-smelling mucus** and **pus.** Flesh and strength are lost rapidly; an irregular temperature; sweating which has the foul odor also.

Prognosis is always grave.

Treatment.—Practically nothing can be done. A pneumonotomy is indicated if process can be isolated by physical signs and patient can withstand interference. Stimulation should be prompt and vigorous; resection of rib, nick pleura when it is reached; enlarge incision on grooved director, and with finger in wound break up pockets and clear out cavity. Where empyema is local make incision over it; where whole cavity is full below scapula behind, in eighth interspace.

Mortality.—Influenced by duration before operation; age; variety of infection; always greater in streptococcic infection; averaging about 15 per cent. **Cause of death** may be malnutrition, sepsis, lighting up of pneumonia or a fresh pneumonia.

ATELECTASIS.

Definition.—A collapse of the alveoli of the lung, generally shortly after birth, though it may occur in various conditions.

Etiology.—Feeble attempts at primary inspiration; plugging up bronchus by mucus aspirated; compression of lung from effusions.

Pathology.—The process may be limited to a small area or scattered through the lung. It is often found over the posterior borders. It is like the liver in appearance, dark in color, and there may be areas of emphysema around it.

Symptoms.—If in the newborn, the chest does not expand, breathing is difficult; cyanosis is present; the infant does not cry and death is inevitable.

Physical Signs.—Feeble or absent murmur over the area, dulness, and râles in surrounding area.

Treatment.—Artificial respiration; insufflation, stimulation, but all are of little avail.

EMPYEMA.

Definition.—A collection of pus in the pleural cavity.

Etiology.—It is seldom a primary affection, generally following pneumonia. It may complicate the exanthemata and diphtheria. It may rarely be due to tuberculosis. The pneumococcus is found in the majority of cases associated often with staphylococci, streptococci, and saprophytes. It may occur some weeks after the pneumonia. It may be caused by an accident, as a fractured rib.

Symptoms.—A diagnosis may have been made of a previous pleurisy with effusion; with a rise in temperature, possibly a chill, pus is suspected. The child has an irregular temperature, it may reach 104° F., more generally it is less; there is cough, perhaps expectoration; child loses weight and is cachectic in appearance.

Physical Signs.—Flatness on percussion in a child is a characteristic sign and is rarely found except in the presence of fluid. This usually is found from the third rib down in front, and from the scapula down behind. There is an entire absence of sounds on auscultation over effusion, and there may be bronchial breathing over compressed lung above. The apex-beat is displaced, which should always arouse suspicion.

Diagnosis.—From pneumonia, is made entirely by the physical signs. In pneumonia there are the crepitant râles, bronchial breathing, and dulness; in effusion, distant breathing, flatness over fluid, and displacement of apex-beat. From pleuritic effusion the diagnosis can only be made by exploratory puncture.

Treatment.—If very small and tendency is to sacculation, it may become absorbed. Rilliet and Barthez report 33 cases not treated surgically, with 21 deaths.

There are several methods of operation, **aspiration,** simple incision, and incision with rib resection. Aspiration should always precede the other operations, for diagnostic purposes if for nothing else. **Subperiosteal rib-resection** is probably the best operation, as it gives more chance for free drainage. Irrigation is not necessary unless to stop bleeding from the pleura. Temporary collapse may occur in operation; anesthetic may be dangerous.

After-treatment should be by tube-drainage, using irrigation only in foul cases; the tube is progressively shortened; use of suction apparatus if lung shows no tendency to expand; recurrences may occur from faulty drainage any time. Deformity of the chest is usually temporary and yields to treatment.

Operation.—Preliminary tapping and subperiosteal rib resection; free drainage; drainage-tube inserted. Incise in eighth interspace, below scapula.

TUBERCULOSIS.

Tuberculosis in infancy and childhood is very frequent, though the mortality in the first few years is greater than before puberty.

Etiology.—*Bacillus tuberculosis,* first discovered by Koch, is the cause of this disease. The bacilli are often found in clumps in tuberculous sputum and tissue, are very resistant, and widely distributed. They may be transmitted in meat or milk, or by the atmosphere. Rarely there has been traced a hereditary transmission, but it is not usual. There is, however, an hereditary tendency in children born of tuberculous parents. Environment contributes greatly to the possibility of contracting the disease; closely populated districts, poor hygienic surroundings, tenements, exposure, all increase the predisposition.

Pathology.—The changes which occur as the result of tuberculosis in any organ are essentially the same. There is a small nodule surrounded by an infiltrated area, as the result of tissue proliferation, and there is a tendency for these growths to break down or caseate; these may coalesce and form large tuberculous masses. There are always a cell proliferation and enlargement of the glands in the neighborhood of these caseating masses. The bacillus is an active factor in the breaking down of the tissue.

Forms.—There are a number of clinical types of tuberculosis: **acute miliary tuberculosis**; **chronic diffuse tuberculosis**; **localized tuberculosis** in any organ or tissue: glands, intestines, liver, peritoneum, lungs, pleura, pericardium, meninges, bone.

Acute Miliary Tuberculosis.

Those cases in which the process runs a very rapid course are generally so classed, though there must have been a local focus primarily.

Symptoms.—This form generally assumes the typhoid type; the symptoms are insidious in their development, with perhaps only a slight indisposition previously or a slight cough. The first symptom of moment is the temperature. A persistent temperature which does not respond to quinine, and with no other symptoms of typhoid, is strongly suspicious of tuberculosis.

The abdomen is distended, and there is a tendency to delirium, or, as the disease progresses, to an exaggeration of the symptoms pointing to the organ most affected.

Diagnosis.—Persistent illness; irregular temperature, which can not be accounted for; rapid wasting; elimination of possible sepsis from other organs not of tuberculous origin.

Prognosis.—This is usually unfavorable, but a change of climate may cure the majority of cases.

Tabes Mesenterica.

Synonym.—Tuberculosis of mesenteric glands.

Lesion of the intestine as a primary condition is not necessary for the development of this condition. The glands involved are those of the mesentery chiefly, and the retroperitoneal glands also. It is discovered at autopsy very often when its presence during life has not been suspected.

Symptoms.—There may be symptoms of an intestinal catarrh with a coincident wasting and impairment of the general health. The diarrhea may be severe, mucus and blood passed frequently, less often blood alone; the abdomen is usually quite distended, which renders satisfactory palpation of the enlarged glands difficult; the condition closely simulates tuberculous peritonitis. If the glands are palpable, the diagnosis is certain.

Pulmonary Tuberculosis.

The most frequent form of this trouble is that following a bronchopneumonia, though it may develop as a primary condition.

Pathology.—There are felt through the lung hard nodular masses which on section prove to be nodules or glands about the bronchi in all stages of development, some hard, others soft and caseous; the surface of the lung may be studded with miliary tubercles. There is generally evidence of a preexisting bronchitis or bronchopneumonia, and cavities may be found here and there in the lung tissue independently of the glands.

Symptoms.—There is a history of an attack of pneumonia of the broncho type as a rule; and the disease occurs in those children who are debilitated from a previous illness, as the exanthemata, whooping-cough, etc. It may follow as a complication in other forms of tuberculosis. The temperature varies from 101° to 104° F. The cough persists with increased rate of respiration and pulse; there are rapid emaciation and prostration, with perhaps a fatal termination in the acute cases in from three to five weeks. There is no expectoration in young children, hence this diagnostic sign is absent.

Physical Signs.—These are largely those of a bronchopneumonia or a more or less localized bronchitis. It is rare that a cavity can be diagnosed during life. The physical signs are those usually of large and small mucous râles, dulness, bronchial breathing, increasing fremitus where there is consolidation, with râles if there is a broken-down area in the consolidated portion of the lung.

Prognosis.—This is always grave, the acute cases rarely living more than three or four weeks; some merge into the chronic type and live much longer.

Treatment.—The principal treatment is that of **prophylaxis.** Children being especially prone to develop tuberculosis in some of its forms, should be guarded against possible contagion, and kept away from tuberculous patients. If they are in the same house, extra precautions should be taken with the sputum from the patient, and the child should be out of doors as much as possible and kept from risk of exposure. Precautions should be taken in regard to the **food,** milk and meat especially, which is given them. **Change of climate** is of avail if resorted to sufficiently early. **Forced feeding** is of assistance, milk, scraped beef, codliver oil; and gavage in those unable to take food in any other way. **Creosote** is of assistance if it does not derange the stomach. No remedy should be given at the sacrifice of the nourishment. **Bathing, rubbing,** and **massage** are of assistance. For the **fever,** sponging, absolute rest, if imperative, phenacetine or phenobromate; for the **sweating,** atropine; for the **obstinate cough,** codeine or heroin; for the **diarrhea,** castor oil in emulsion, small doses for several days followed by bismuth; pepsin and hydrochloric acid for **digestion.**

Chronic Pulmonary Tuberculosis.

This form is seen **mostly in older children,** following as a rule a bronchopneumonia upon which has been engrafted a tuberculous process. It **may begin as** an acute attack or follow slight inflammatory conditions of the lung, or there may have been an unsuspected latent trouble affecting chiefly the bronchial glands, lighting up as a general pulmonary condition upon the development of some other acute process.

Pathology.—There are usually found at autopsy enlarged bronchial glands, broken down and in various stages of development; miliary tubercles scattered over the surface of the lung; the pleura is thickened and there may be adhesions of more or less density.

Symptoms.—There are a chronic fever, sweats, cough increasing in severity, gradual loss of strength and flesh, increasing anemia and pallor; anorexia; feeble accelerated pulse; the emaciation becomes more rapid toward the end and the patient is entirely bedridden.

Physical Signs.—The signs are those of consolidation and cavity-formation; increased fremitus; dulness; bronchophony; bronchial or cavernous breathing; with the adventitious sounds accompanying softening and cavity-formation, moist râles, gurgles, etc. Because of the attenuation of the chest the signs are less easily obtained in the child than the adult.

Diagnosis.—Enlargement of the bronchial glands is most difficult to make out clinically. A chronic pneumonia is always suggestive of tuberculous origin, and an examination of the sputum should be made if a specimen can be obtained for confirmation of the provisional diagnosis.

Prognosis.—The prognosis is always bad in this form, though the patient may live for a long time.

Treatment.—Creosote and codliver oil are the remedies which give the best results. Careful diet, hygienic regulation, and fresh air are essentials.

QUESTIONS.

Define acute coryza.

Name the predisposing and exciting causes.

What are the pathology and symptoms?

Give the treatment, local and general.

Discuss the essential features of chronic rhinitis, its etiology, pathology, symptoms, and treatment.

Define epistaxis. What are the symptoms and treatment?

Where are nasal polypi located, and what is their pathology? How treated?

What are the synonyms for adenoid vegetations?

What is the pathology? Give the symptoms and diagnostic means.

What is the treatment?

Describe acute bronchitis, giving its symptoms and treatment.

Describe the essential features of chronic bronchitis.

What are the symptoms and physical signs? Give the treatment.

How many forms of acute bronchitis?

What are the symptoms?

Describe the physical signs presented in both stages. How differentiated from bronchopneumonia?

Give the prognosis and treatment.

How does the chest of the infant differ anatomically from the adult's?

What are the synonyms of lobar pneumonia?

Describe the etiology, and the pathology of the various stages.

Give the symptoms and course.

What physical signs are present in the various stages?

Name the pathognomonic sign of the first stage.

What clinical types are encountered?

Give the treatment in detail.

Define pleurisy, its varieties and causes.

Discuss the primary and secondary forms.

What pathologic changes are noted in the pleura in the dry, fibrinous, exudative, and suppurative forms?

What are the means employed in physical diagnosis?

What signs are obtained in the dry and moist forms on (*a*) inspection, (*b*) palpation, (*c*) percussion, (*d*) auscultation?

What is the pathognomonic sign obtained on percussion of pleurisy with effusion?

How may empyema and pleurisy be differentiated by physical signs?

Name some of the diagnostic signs of pleurisy.

What is the principal indication for treatment?

When would aspiration in effusion be done?

What is the difference in the operation in pleurisy with effusion and empyema?

What is the after-treatment?

Describe bronchiectasis and emphysema. How caused?

Describe the symptoms and physical signs. How treated?

What are the synonyms of bronchopneumonia?

What are the lesions? What the clinical history?

Describe the physical signs, and give the differential diagnosis.

What is the local and general treatment?

Discuss in all its phases chronic bronchopneumonia.

Describe asthma and name the causes.

What is the pathology?

Give the symptoms and physical signs.

How treated during the paroxysm and in the interval?

What is the pathology of hay fever, the clinical course and treatment?

Describe gangrene of the lung in all its phases, giving symptoms and treatment.

What is atelectasis, and when is it encountered?

Name the physical signs.

What pathologic process constitutes an empyema?

How differentiated from a pleurisy with effusion?

What are the physical signs?

Give details of the treatment by various methods, and the post-operative treatment.

What are the predisposing and active causes of tuberculosis?

What is the essential lesion? How many forms?

Describe acute miliary tuberculosis, and give the symptoms.

Describe tabes mesenterica, and give its symptoms.

What pathologic processes are found in pulmonary tuberculosis?

What clinical symptoms present? Give the physical signs encountered.

What prophylactic treatment should be advocated? Other treatment?

Discuss chronic pulmonary tuberculosis, giving its symptoms, course, signs, and treatment.

CHAPTER XXI.

DISEASES OF THE GENITOÜRINARY SYSTEM.

THE URINE.

THE **urine of a healthy infant** should be nearly colorless, should not stain the napkin, be of a specific gravity of 1004 to 1010, and at six months of age amount to about 16 ounces in twenty-four hours. Young infants pass urine much more often than older children; by the third year they should be taught to use a vessel.

Uric acid is excreted in much greater quantities in the newly born than in later life, and frequently during childhood the quantity increases under certain abnormal conditions. **Sugar** may be present in the urine of healthy infants, and albumin is occasionally found. **Hematuria** and **hemoglobinuria** are occasionally detected in children. Pus when present is indicative of conditions similar to those which cause such a condition in older children and adults. **Indican** is found frequently, and is suggestive of indigestion, epilepsy, and acute and chronic intestinal disease. **Xanthin** and other products of this group have been studied by Rachford and others without any deductions of value as yet.

DIABETES INSIPIDUS.

Synonym.—Polyuria.

Etiology.—Diabetes insipidus usually occurs in children under ten years of age, associated with some nervous phe-

Age, years.	Weight, klg.	Sex.	Total specimens.	Amount, c.c.	Specific gravity.	Urea, per cent.	Total urea, gm.	Chlorides, per cent.	Phosphates, per cent.	Sulphates, per cent.	Amount to 1 klg. body weight, c.c.	Urea to 1 klg. body weight, c.c.
3	16.8	2 M	5	358	1024.0	2.2	7.87	12.5	12.00	1.08	21.3	.468
4	16.9	7 M 4 F	31	299	1027.1	2.9	8.67	11.17	9.22	1.41	17.6	.513
5	16.8	1 M 7 F	17	392	1024.5	2.6	10.19	10.37	8.89	1.13	23.3	.606
6	16.7	2 F	2	405	1023.0	2.7	10.94	11.00	6.50	1.13	24.2	.655
7	20.9	1 M 3 F	4	564	1018.0	1.1	6.20	7.00	5.63	0.85	26.9	.296
8	22.6	2 M 7 F	20	628	1021.1	2.2	13.82	9.16	7.32	1.11	27.8	.611
9	26.2	1 M 9 F	25	731	1020.7	2.3	16.81	8.46	7.61	1.10	27.9	.641
10	27.5	2 M 6 F	15	768	1023.5	2.1	11.28	9.29	6.85	1.10	27.9	.592
11	27.2	1 M 3 F	7	716	1018.8	2.3	16.83	10.03	7.50	0.92	26.3	.618
12	36.4	2 M 3 F	8	829	1021.5	2.8	23.21	9.27	6.77	1.00	22.7	.637
Tot.		19 M 44 F	134									

Age.	Weight.	Sex.	Amount in single specimen, c.c.	Twenty-four hour amount c.c.	Specific gravity.	Urea, per cent.	Chlorides, per cent.	Phosphates, per cent.	Sulphates, per cent.	Remarks.
1 day.	3.18 kil.	F	3			.4				
12 days.	3.86 K. 1 infant.	. . . .	36	. . .	1003	.1	Passed at 12 M,			
3 weeks.	4.14 K.	. . . .	. .	. . .	1001	.5	" 9 A.M.			
3¼ "	4.25	. . . . M	30	. . .	1005	.2	" 4 P.M.			One hour after breast.
4 "	4.47	. . . .	23	. . .	1004	.1				
1 year.	9.98	. . . .	9	. . .	1021	2.6				
1 "	. . . . . .	. . . .	. .	. . .	1026	2.7	12	16	1.75	Dentition slow.
1¼ years.		F	. .	195	1030	2.5	18	11	1.25	One specimen.
13 months.	9.76 kil. (21¼ lbs.)	F	. .	. . .	1026	2.3	11	11	1.00	Mixture night and day urine.
20 "	. . . . . .	. . . . M	. .	290+	1028	2.8	16	13	1.75	
20¼ "	. . . . . .	. . . .	. .	325+	1026	2.1	8	12	1.00	
2 years.	14.07 K. (31 lbs.)	M	. .	450	1020	1.7	6.5	6	1	
		3 M 3 F	12 specimens in all							

nomenon, or resulting from a blow upon the head causing concussion; tumors of the brain, especially in the occipital region.

Pathology.—There is no special pathology; no lesions of the kidneys, though it has been supposed that irritation of the fourth ventricle is an important etiologic factor.

Focal Symptoms.—Large quantities of pale-colored urine are passed during each twenty-four hours, from 5 to 15 or 20 pints a day. The specific gravity is low, rarely above 1008, and sugar is absent.

Systemic Symptoms.—Great thirst, rapid emaciation, pallor, nervousness and restlessness at night occur. The duration is variable, but may continue for years, with periods of temporary improvement.

Diagnosis.—This must be made from **diabetes mellitus** and chronic interstitial nephritis by examination of the urine.

Prognosis.—There may be a spontaneous cure; chronic cases do not respond well to treatment.

Treatment.—Restrict the ingestion of fluids as much as possible; nutritious diet containing a large amount of meats and small amount of carbohydrates. Drugs are of little avail, though success is claimed from the use of ergot, gallic acid, arsenic, the bromides and antipyrin, and general tonics.

FUNCTIONAL ALBUMINURIA.

Synonym.—Cyclic albuminuria.

Etiology.—This condition is seen not infrequently in young adult life and about puberty. It is more common in males than females. As the name implies, it may recur with regularity, more often by day than at night; fatiguing exercise; certain articles of diet; exposure; cold bathing or remaining too long in the water; uric acid in excess.

Pathology.—No lesion is found. Possibly mainly an exudation of serum due to a vasomotor disturbance.

Focal Symptoms.—These cases as a rule present only the presence of albumin in the urine; casts (except occasionally hyaline) are absent in nearly all cases.

Systemic Symptoms.—Dyspepsia is frequent.

Diagnosis.—Its cyclic character noted on a number of occasions; the apparent good health otherwise and absence of symptoms of serious kidney disease.

Prognosis.—In those cases in which no organic lesion can be demonstrated the prognosis is good, but such cases are liable to develop serious kidney disease later in life.

Treatment.—A **diet** which is composed largely of milk should be used; careful **exercise** and **bathing**; prevention of exposure; treatment of any symptoms of dyspepsia that may arise; and the administration of iron if anemia presents.

HYDRONEPHROSIS.

Definition.—This is a condition in which there is a cystic degeneration of the kidney or an obstruction in the ureter close to the kidney and its dilatation with urine. It is not a very frequent occurrence, and children so affected do not live very long. The bladder is usually markedly hypertrophied.

Symptoms.—There are no symptoms from which a diagnosis may be made unless there is a tumor of sufficient size to be palpated, which may be large enough to fill the abdomen or be felt in the lumbar region. Usually no urinary symptoms present, as the opposite kidney, if unaffected, does the work of both.

Surgical Treatment.—If a tumor may be recognized and the child is in condition to stand an exploratory operation, a nephrotomy should be performed. If the trouble may be removed, as an obstruction close to the kidney, this should be done. If not, and the other kidney can be demonstrated to be doing the work, a nephrectomy should be carried out.

Medicinal treatment is of little value except to support the strength.

ACUTE PARENCHYMATOUS NEPHRITIS.

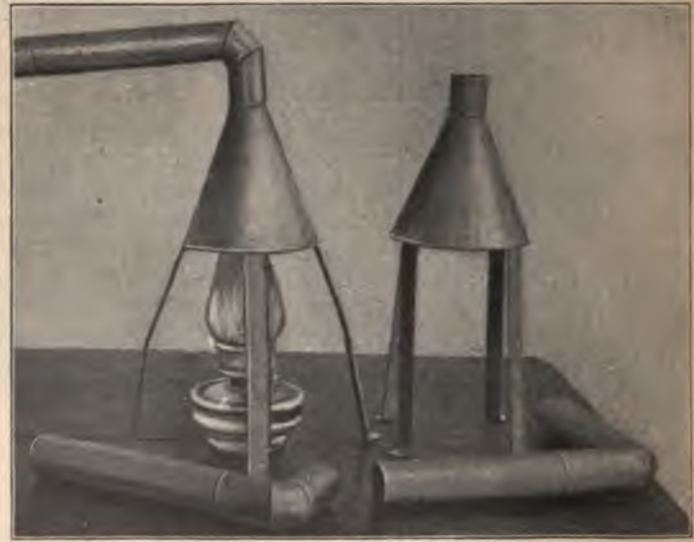
Synonyms.—**Acute exudative nephritis; Acute desquamative nephritis; Acute Bright's disease.**

Etiology.—Acute parenchymatous nephritis may be a pri-

mary or a **secondary** condition. If primary, no discoverable cause may exist; if secondary, it is generally due to one of the contagious diseases (the exanthemata, diphtheria) or to septic conditions from other causes.

Pathology.—There are degeneration of the epithelium and marked tissue-changes, the stroma being infiltrated with white blood-cells and serum, which causes an enlargement and softening of the kidney. The tubules may be dilated with urine, epithelial and red blood-cells. Minute abscesses may be scattered through the kidney.

FIG. 33.



Tuley's hot-air apparatus.

Symptoms.—**Systemic.**—The onset is sudden, with vomiting, high fever, and rapid, tense pulse. Convulsions may precede or supervene active symptoms. Edema is present early; and blindness occasionally.

Focal.—The urine is scanty, high colored, and contains albumin, casts, and probably blood in the majority of cases. Secondary anemia is present early, also the "waxy" skin; headache, restlessness, and lumbar pain or sense of heaviness occur in older children. The duration is from a few days to three or four weeks.

Prognosis.—The prognosis is grave in young children, although a large number recover without serious permanent damage to the kidney.

Treatment.—Prompt, vigorous, intelligent, and careful treatment should be given these cases. Indications: (*a*) relieve the kidneys of the extra work of draining transuded serum from the tissues, as well as the retained products of tissue-metamorphosis usually excreted by the kidneys, and retained because of their damaged state; (*b*) restore the kidneys to their normal condition; (*c*) endeavor by intelligent medication and diet to prevent further damage to the diseased organs.

General Management.—Keep the child in bed in a warm room and protected from chilling, and on **absolute milk diet**; give calomel followed by salines, early, for catharsis and diuresis; and hot packs or hot-air baths for diaphoresis. Blood-letting should be employed in the plethoric for very tense pulse. Caffeine, nitroglycerin, and strychnine are valuable stimulants. Give water freely by mouth, or if this be impossible, by high enemata, to aid the kidneys. In convalescence iron is an invaluable tonic for the secondary anemia.

Prophylaxis.—In all cases of infectious disease watch the kidneys, keep the bowels and skin normally active, and the urine diluted by plenty of water-drinking to lessen the burden upon the kidneys.

ACUTE DIFFUSE NEPHRITIS.

Synonym.—Acute glomerulonephritis.

Acute diffuse nephritis is a more severe form of inflammation and more apt to leave a damaged kidney after the acute attack than the parenchymatous nephritis.

Etiology.—It may be a primary disease, but is more often a secondary condition, its typical kidney being seen after scarlet fever or exposure to cold or wet.

Pathology.—In addition to the changes of the desquamative variety there are deposits of new connective tissue in the stroma of the kidney and marked changes in the glomeruli. The kidneys are enlarged and softened. These structural changes are more or less permanent and leave a damaged kidney.

Diagnosis.—Is difficult to make clinically in many cases. Close observation with frequent examination of the urine may be successful.

Symptoms.—In **primary** cases the onset is usually sudden, with headache, vomiting, scanty or suppressed urine, and early dropsy. In **secondary** cases the invasion is apt to be more insidious **systemically**, with lower fever, loss of appetite and strength, many gastric symptoms, dropsy, and in some cases anasarca; and **focally** with diminished or suppressed and highly albuminous urine with casts of every variety and in large numbers, and at times blood. The duration of the acute symptoms is from one to three weeks, disappearing gradually, with a tendency to relapses.

Prognosis.—The primary danger is to life, a great number proving fatal. Recovery is generally with a damaged kidney. **Uremia** is a frequent manner of death. The acute may be followed by the chronic form.

Treatment.—The treatment is largely that of acute parenchymatous nephritis. Rest in bed, freedom from exposure, diaphoresis, elimination by bowels also, tonics (iron) in convalescence. The diet should be largely of carbohydrates, milk, and a large quantity of water.

CHRONIC NEPHRITIS.

Synonyms.—Chronic Bright's disease; Chronic interstitial nephritis.

A rare condition in infancy, less so in childhood.

Etiology.—Most frequent as a result of acute secondary nephritis, prolonged sepsis, alcoholism, syphilis, tuberculosis, malaria, etc.

Pathology.—Two varieties are recognized, **with** and **without exudation. In the form with exudation** the kidneys are enlarged, slightly nodular, and on section white or yellowish white in color. The renal epithelium is swollen; the tubes full of broken-down cells, casts, and detritus. There is new connective tissue about the tufts. **In the form without exudation** (granular kidney) the kidneys are smaller than normal, rough, and the capsule adherent. The cortex is thin and reddish in color. Connective-tissue formation throughout the kidney is characteristic of this variety; it presses upon and irregularly dilates the tubules forming cysts.

1. **Symptoms of Chronic Nephritis with Exudation.**—This is usually secondary to an acute attack; the symptoms are insidious, systemically with anemia, headache, loss of appetite, and dropsy varying in amount. Neuralgia may be prominent. **Focally,** the urine is scanty, with casts and, in severe cases, blood. The **course** is chronic and discouraging.

2. **Symptoms of Chronic Nephritis without Exudation.**—The child is in poor general condition, with anemia, prostration, headache, tendency to inflammation of the endocardium, arterial tension high, little or no dropsy. The urine is excessive, pale, and of low specific gravity; but in acute exacerbations is apt to be scanty. Little or no albumin and very few casts occur.

Prognosis.—The outlook is bad. The disease runs a chronic course with frequent exacerbations. No limit may be set for the duration.

Diagnosis.—This necessitates frequent examination of the urine, a procedure too often neglected by physicians.

Prophylactic treatment is the best treatment. An examination of the urine should be made in all cases of headache, progressive loss of flesh, anemia, etc., when early diagnosis is possible.

Curative Treatment.—Warm clothing and protection from exposure; **diet** of carbohydrates, milk, and fruits; free daily evacuations; carefully regulated **exercise** and habits; mild climate if possible; **venesection** if uremia is imminent; **morphine** used sparingly; **nitroglycerin** for high arterial tension.

Delafield states that morphine is very apt to poison all cases, and should not be used unless the arterial tension is high.

TUMORS OF THE KIDNEY.

Varieties.—In children the majority are malignant, generally primary, and sometimes congenital; their form is commonly **sarcoma** (round or spindle cell) and occasionally **myosarcoma.** Benign tumors are rare.

Symptoms.—The diagnosis is generally not made until the **tumor** is of sufficient size to palpate, which with **cachexia** makes recognition almost certain. **Hematuria** is generally and pain often present. The duration is very short, especially after the tumor is palpable.

Treatment.—This is entirely surgical and gives but little hope even if performed early.

PYELITIS.

Definition.—Pyelitis is an inflammation of the lining membrane of the pelvis of the kidney; **pyelonephritis** is an involvement of the kidney coincidently; **pyonephrosis** is an accumulation of pus in the pelvis.

Etiology.—Renal calculi in the pelvis; extension upward from the bladder (rare in children); septic infection from the circulation; complicating the exanthemata; or trauma.

Pathology.—One or both kidneys may be involved. Suppurative inflammation of the pelvic mucosa with minute hemorrhages often, and later involvement of the kidney in protracted cases.

Symptoms.—**Systemic.**—There are chills, irregular fever, pyuria, exhaustion, loss of flesh. **Fecal.**—Diminished urine with much pus, some albumin, many casts and broken-down epithelium. In cases with stone the general symptoms are few.

RENAL CALCULI.

Synonym.—**Stone in the kidney.**

Etiology.—**Concretions** forming in the pelvis or substance of the kidney constitute calculi. They are comparatively frequent in children through errors in metabolism, and are composed usually of uric acid and occasionally of oxalate of lime, cystin, and xanthin. Large calculi are comparatively rare.

Focal Symptoms.—Small calculi pass often without pain, being seen on the napkin or in the bottom of the vessel. Larger stones cause great pain in passing from the kidney to the bladder and perineum, and in males to the head of the penis. Retraction of the testicle is a common reflex.

Systemic Symptoms.—Chills, shock, prostration, and intense pain; sometimes vomiting occurs.

Treatment of an Attack.—Give hot baths, and if necessary in older children opium in some form for the spasms and pain; between attacks large amounts of water as solvent and diluent prophylaxis. Obstruction of the ureter causes hydronephrosis or pyonephrosis, and these require operation.

PERINEPHRITIS.

Definition.—Perinephritis is an inflammation of the connective tissue surrounding the kidney, from which an abscess may result. It is frequently confounded with disease of the vertebræ.

Etiology.—The affection may be primary or secondary. The **primary** form is due to traumatism, exposure, cold; the **secondary**, to kidney disease, disease of the vertebræ, or following one of the infectious diseases.

Pathology.—There is an acute exudative inflammation in the connective tissue around the kidney, which is quite loose in this region.

Focal Symptoms.—The **onset** is sudden, with chill, rapid rise of temperature, pain located in the lumbar region, referred to the groin, thigh, or knee, increased by moving the leg, tenderness over loin. Perinephritis may begin slowly, with gradually increasing lameness, pain, slow fever, deformity due to contraction of the thigh flexors.

Systemic Symptoms.—Fever continues, septic symptoms, frequent vomiting; abscess may break through the skin over the kidney, or it may burrow along the **psoas muscle** and rupture at the groin, the peritoneal cavity, or the bowel. The duration varies from three to eight weeks in acute cases, and longer in subacute or chronic cases.

Diagnosis.—From **pyelitis** in that there is no pus in the urine. From **hip-joint disease**; in the latter the symptoms are more insidious, chronic in course, abscess not frequent early in the trouble, deformity and limited motion quite early. In **Pott's disease** there is the deformity of the spine.

Prognosis.—Good; most cases recover without deformity or trouble.

Treatment.—Absolute rest in bed; light diet; ice or heat locally as preferred; poultices if suppuration seems inevitable, and free incision as soon as pus can be demonstrated.

ENURESIS.

Synonyms.—Incontinence of urine: Bed-wetting.

Etiology.—A continuation of the infantile habit into the third year; disease of the central nervous system, as epilepsy; increase of spinal reflexes, especially from the genitals, rectum, or anus; a highly acid urine; cystitis, calculus; heredity; extreme nervousness, and anemia.

Symptoms.—The only symptom is the involuntary passage of urine both when awake and asleep, though it may take either form. The form which occurs only at night is the most common. It may occur several times in one night, once or twice a week, or less often. It may continue until puberty.

Prognosis.—The prognosis is hopeless when the cause is an organic brain lesion; the earlier malformations are corrected the better the prognosis; persistence in the treatment influences the prognosis.

Treatment.—If a cause may be found and removed early, there is generally no other indication for treatment. Improve the general health; regulate the quantity of fluid the patient takes after 6 o'clock in the evening; at 10 o'clock in the evening awaken child to empty bladder; encourage it to hold the urine as long as possible in the daytime; raise the foot of the bed; encourage child to sleep on side and not on back. Of drugs, **belladonna** heads the list. It should be given for its physiologic effects and over a long period of time. Best in the form of:

℞ Atropiæ sulphatis,	gr. ss;
Aquæ dest.,	℥j.

M. et ft. solutio.
Sig.—One drop for each year of the child's age, at 4, 5, and 6 o'clock, watching for the physiologic effect.

Many cases will not yield to treatment at all. Circumcision in males and its analogue in females should always be done.

PHIMOSIS.

There is a **congenital phimosis** in all male children, but as the penis enlarges the natural adhesions are broken up and the glans penis forced through the foreskin to a certain point. If when the child is a month old the foreskin is forcibly retracted over the glans, the adhesions will be broken up and the accumulated smegma behind the corona may be removed. This enlarges the opening in the foreskin, and if the operation is repeated every two or three weeks there will never be any necessity of a circumcision being performed.

Symptoms.—There may be no symptoms except an occasional difficulty in passing the urine; if adhesions are firm, there may be reflex symptoms referred to the hip or spine; night-terrors; epilepsy; insomnia; chorea, etc.

Treatment.—If early retraction has been neglected and it is impossible to force the foreskin over the glans, a circumcision may be necessary, and should be done early. The dorsal incision without removal of a part of the foreskin should never be performed.

BALANITIS.

Definition.—**Balanitis** is an inflammation of the mucous membrance covering the prepuce and glans penis.

Etiology.—Phimosis; decomposition of smegma; masturbation; urethritis; infection.

Symptoms.—There are swelling of the foreskin covering the glans, redness, and pain. As the smegma disintegrates there are a discharge and frequently pain on passing water.

Treatment.—The object of treatment is perfect cleanliness. A boric acid solution is very effectual. If the prepuce can not be retracted, a circumcision should be performed and the treatment kept up.

URETHRITIS.

Definition.—Urethritis is an inflammation of the urethra, and may be **specific** or **simple,** affecting both sexes, females more frequently than males because of the prevalence of a vulvovaginal inflammation in girls.

Etiology.—It may arise in simple inflammations from uncleanliness, but the most frequent cause is a gonorrheal infection. Direct contagion is usually the mode of infection.

Diagnosis.—A diagnosis may only be made by a microscopic examination of the pus, which should be done in all cases in which there is a discharge.

Treatment.—The treatment is in all respects the same as in adults, except that it is of the greatest importance to keep the parts covered in order to prevent infection of the conjunctiva.

VULVOVAGINITIS.

Definition.—**Vulvovaginitis** is an inflammation of the mucous membrane of the vulva, vagina, urethra, and the cervix uteri, and may be simple or specific.

Etiology.—The **simple** form is due to uncleanliness, to dirty napkins; using napkins after wetting which have not been well washed; pin worms or other infection from the rectum. It may be epidemic in institutions; masturbation is a cause from the irritation which it produces, or, **vice versa,** masturbation may be caused by the inflammation. The specific form is due to the gonococcus, from the use, most often, of *towels or other* articles which have been infected.

Symptoms.—In both forms there are burning and itching of the parts with an attempt to hold them or to scratch constantly. There is a discharge which is light colored at first, but soon becomes creamy and thick, encrusting on the parts adjacent externally. The mucous membrane is red and inflamed; the skin is moist and excoriated, the glands of the groin and of the vulva are enlarged. The duration of the simple cases is from one to three weeks, of the specific some time longer.

Diagnosis can only be made by a microscopic examination.

Complications may exist in the form of urethritis, arthritis, glandular inflammations, pyosalpinx, peritonitis.

Treatment.—Cleanliness in both forms, irrigations with a bichloride solution, protection of the clothing by wearing a vulval pad. Local application of antiseptics through a speculum is often required in the specific form.

QUESTIONS.

What are the essential differences between the urine of children and that of adults?

What are the normal specific gravity and quantity passed in twenty-four hours?

What are the etiology and pathology of diabetes insipidus?

Give the focal and systemic symptoms. How treated?

What is the etiology of cyclic albuminuria?

What symptoms present? What is the prognosis? How diagnosed? Give the treatment.

Define hydronephrosis and give its symptoms. How treated?

What are the synonyms of acute parenchymatous nephritis?

Give the focal and systemic symptoms.

What are the indications for treatment? How met?

What is the prophylaxis?

Define and give synonyms of acute diffuse nephritis.

Give its etiology and pathology.

What are the systemic and focal symptoms?

What is a frequent mode of death? Give treatment.

Give the etiology and the pathology of types of chronic nephritis.

Give the symptoms of both varieties. What is the treatment?

What varieties of tumors are found in the kidney? How diagnosed? What are the indications for treatment?

Define pyelitis, and give its etiology and pathology.

What symptoms present? How treated?

How are renal calculi recognized?

How is renal colic treated? What can be done between attacks?

Define perinephritis. What is the etiology of the two varieties?

What are the symptoms, and how diagnosed? How treated.

What are the causes of enuresis?
How many clinical varieties? What is the symptom? How treated?
Define phimosis, and give the treatment.
What will prevent necessity of circumcision?
Define balanitis, and give its symptoms and treatment.
What is the most frequent causes of urethritis?
Discuss its history and symptoms, and give the treatment.
Give the etiology of the two forms of vulvovaginitis. What are the symptoms? How treated?

CHAPTER XXII.

DISEASES OF THE EAR.

ACUTE OTITIS MEDIA.

Etiology.—The primary seat of the disease in the majority of cases is in the nasopharynx and extends through the Eustachian tube. Chilling, sea-bathing, dentition, adenoids, acute rhinitis, use of the nasal douche are all active factors.

Pathology.—The inflammation spreads through continuity of structure from the nasopharynx to the mucous membrane of the middle ear. It may be limited to the Eustachian tube or extend to the middle ear, and may be of the catarrhal variety or purulent.

Systemic Symptoms.—Pain and fever are characteristic symptoms. From a sense of fulness over the affected ear it becomes a severe pain, lancinating in character. In the very young the pain is evidenced by restlessness and crying, and pulling at the affected ear. There may be delirium and convulsions. The fever may reach 103° to 104° F. With the fever there may be anorexia, malaise, headache, and constipation.

Focal Symptoms.—If an observation may be had of the drum-membrane, it is found deeply congested. The handle of the malleus may be obscured. Effusion in the cavity may escape through the Eustachian tube if the swelling of its mucous membrane will permit. If bulging of the posterior-inferior quadrant of the tympanic membrane occurs, rupture *of the drum* is imminent.

Diagnosis rests upon the symptoms, corroborated by inspection of the drum membrane.

Prognosis.—In the catarrhal form recovery without impairment of hearing is general; in the purulent form impairment of hearing is common.

Treatment.—Treatment of primary disturbances in the nasopharynx generally prevents an attack. Administer an active laxative early, followed by small doses of aconite frequently repeated, restrict the diet, and insist upon rest in bed. Continuous irrigation with hot water is most beneficial. Instillation of morphin, atropin, and cocain, in solution, into the external canal is of no avail. Paracentesis of drum is indicated where rupture seems inevitable. Scrupulous cleanliness of the ear is absolutely necessary if rupture takes place. Politzerization of the middle ear upon entire subsidence of the active inflammation is of benefit in the after-treatment.

CHRONIC OTITIS MEDIA

This affection may be either of the **catarrhal** or **purulent variety.** The latter is much more serious.

Etiology.—Chronic otitis media is invariably secondary to conditions of similar nature in the nasopharynx, and occurs especially in those with poor nutrition and in bad hygienic surroundings. Neglect of proper treatment of nasopharyngeal troubles is a contributing factor. The suppurating form may be tuberculous from the beginning, but usually follows the acute suppurating form.

Pathology.—The same steps are followed as in inflammation of the mucous membrane in the nasopharynx. In the catarrhal variety there may be a **hypertrophic** and an **atrophic variety.** In the purulent form three stages are recognized: first, **hyperemia** and **thickening** of the mucous membrane, and **purulent secretion**; second, **caries** and **necrosis**; third, extension of disease to **antrum** and to **mastoid cells.**

Symptoms.—In all cases there are more or less discharge and **impairment** of **hearing.** **Tinnitus** is a forerunner in the catarrhal variety. Pain is infrequently present. There is a perforation of the drum-membrane with discharge of serum, seropus, or a thick, creamy pus which may be very offensive, and often quite profuse. The child may have eczema at the meatus and enlarged cervical glands.

Diagnosis.—Presence of discharge from the ear with perforation of the drum-membrane is sufficient to make a diagnosis.

Prognosis is influenced by duration, age, environment, and general condition. With obstinate and profuse discharge, offensive odor, and a brownish discoloration, the prognosis is not so good.

Treatment.—Free drainage is of the greatest importance, which depends on size and location of opening in drum-membrane. Either **wet** or **dry** method may be employed. The dry method necessarily must be preceded by thorough cleansing. Any mild antiseptic may be used: carbolic acid, 2 per cent.; boric acid, 3 per cent.; potassium permanganate, 5 per cent.; bichloride of mercury, 1 : 3000; or antinosin, 2 per cent. The solution is employed with a syringe, and used only when drum-opening is sufficiently large to permit ready escape of fluid. Canal is mopped after irrigation, and to the granulations or polypi a metallic astringent should be applied.

Attention should be paid the general health of the patient.

QUESTIONS.

Describe the etiology, pathology, and symptoms of acute otitis media.
Give the preventive treatment and that during the attack.
Define chronic otitis media
Give the etiology, pathology, and treatment.

CHAPTER XXIII.

DISEASES OF THE BONES AND JOINTS.

PERIOSTITIS.

Synonyms.—Acute periostitis; Phlegmonous periostitis; Necrosed bone.

Etiology.—Traumatism; exposure; pyemic infection; sequela of one of the exanthemata.

Pathology.—There may be an inflammation of the periosteum in which a collection of pus occurs between it and the bone, the periosteum is lifted up, the circulation of the bone is interfered with, and destruction takes place.

Systemic Symptoms.—Fever 103° to 105° F.; rigors, pain, anorexia, and constipation.

Focal Symptoms.—Pain and swelling of affected limb, extension of inflammation to the neighboring joint, though inflammation may be limited by the attachment of the periosteum to the epiphyseal line. If not interfered with, necrosis of bone takes place.

Treatment.—Free incision should be practised early along the axis of the bone, and all pockets evacuated. If discharge persists, sequestra have probably formed, and should be removed under a general anesthetic.

DACTYLITIS.

Definition.—This condition is generally a tuberculous osteomyelitis or periostitis attacking the first phalanx of one or more fingers.

Symptoms.—Dactylitis is chronic from the beginning, with little pain or tenderness; there is an enlargement, **fusiform** in outline; abscesses form with rupture finally of pus and detritus. The phalanx is apt to be permanently destroyed or deformed. Sequestra are frequently thrown off, but the discharge may continue for years until all dead bone has separated and been thrown off.

Treatment.—If abscesses are demonstrated, they should be freely opened and all caseous material removed, and the cavity injected with iodoform. Keep the part at rest on a splint.

ARTHRITIS.

Joint-diseases are common in childhood. They may be simply an acute synovitis with serous effusion, or may be chronic with purulent effusion. All joints may be affected, but the hip and knee are most often involved. The process may be simple or tuberculous in nature.

Pathology.—There is a thickening of the synovial membrane, with tendency to formation of abscesses; an osteomyelitis is a frequent accompaniment.

Systemic Symptoms.—The disease begins usually with a chill and fever, with probably sweats. There are general malaise and often prostration. In the chronic form there is a tuberculous history. A child, below par, is stricken with one of the exanthemata or pertussis, loses ground, and trouble with the joint follows an injury.

Focal Symptoms.—The joint is swollen, tender, red, and painful; signs of fluctuation may be present early, motion is impaired, flexion gradually takes place, and abscesses soon form and burst unless interfered with.

Prognosis.—Recovery with a damaged joint is entirely possible, but death frequently takes place from sepsis or exhaustion, occurring probably in 10 per cent. of all cases.

Treatment.—Build up patient's general condition, relieve pain by local applications and anodynes, fixation of joint to prevent flexion, free incision if pus is demonstrated.

HIP DISEASE.

Synonym.—Morbus coxæ.

Definition.—A tuberculous inflammation of the hip-joint. Common in children, more frequent in boys and in the delicate and poorer class.

Etiology.—The *tubercle bacillus* is the actual cause of the disease, a slight injury being the exciting factor in some instances. Occurs most often after the third year of life.

Pathology.—There may be a synovitis, epiphysitis, inflammation of the neck of the femur, primarily in the acetabulum and extending to the bone, which may involve the shaft. Cold abscesses result from the destruction of tissue.

Symptoms.—**Pain** is one of the earliest symptoms, being referred to the hip, buttock, or back. It may be present for a while and then cease for a variable length of time. It occurs at night as the result of muscular spasm which follows relaxation during sleep. There are also tenderness and pain on pressure. **Limping** is early present and is progressive; **rigidity** of the joint or **limitation** of **motion** in every direction is early present. This is due either to adhesions, muscular spasm, or muscular contraction. **Deformity**, caused by flexion, abduction, and outward rotation, is early present, but when destruction of bone occurs there are adduction and inward rotation. There is **wasting of the limb**, and **abscesses** are common. A change occurs also in the **outline of the hip**, especially a flattening-out of the gluteal fold.

Diagnosis.—Should be by exclusion. Lameness, atrophy, pain, limitation of motion should be sufficient for diagnosis.

Prognosis.—Death may occur from exhaustion, general tuberculosis or tuberculosis in other organs; and if recovery does take place, there may be marked deformity, lameness, and atrophy. The earlier the treatment the better the prognosis.

Treatment should be begun early, rest in bed, extension to reduce deformity, and application of an extension splint allowing the patient to go about. Good food, sunshine, tonics, and codliver oil are excellent adjuvants. When abscesses form, these should be treated on general surgical principles. Excision of the joint is advisable where the disease progresses in spite of intelligent treatment.

SPINAL CARIES.

Synonym.—Pott's disease.

Definition.—A tuberculous inflammation of one or more of the spinal vertebræ.

Etiology.—The tubercle bacillus is the active agent; bad hygienic surroundings, infectious diseases, and traumatism are contributing causes.

Pathology.—Caries begins in the body of the vertebræ; tuberculous abscesses are common, which may remain local or burrow down the psoas muscle and be evacuated at its insertion; the intervertebral disks soften and an angulation takes place, causing the typical deformity of Pott's disease, which is due to coalescence of the superimposed bodies. The nerves, membranes, and cord may be involved in the inflammatory process or simply pressed upon by the exudate or the deformity.

Symptoms.—The onset is gradual, the child being listless and stiff in his movements, especially when attempting to bend over or stoop. With the advent of **pain** there are restless nights, the pain often being referred to the abdomen; **rigidity** soon occurs, and the child assumes positions which relieve pressure on the spine. **Deformity** soon begins (the usual one is a **kyphosis**), and **abscesses** are also formed.

Location of the disease may be at any point in the spine.

The **course** of the disease is chronic, lasting over a number of years.

Diagnosis.—Rigidity of spine; tenderness, pain—with its characteristic distribution—deformity, abscesses, form a group of symptoms which should make the diagnosis easy.

Prognosis for life is good if the case is seen early; but the patients may die from tuberculosis located elsewhere. Some deformity almost always results.

Treatment.—Rest in bed; extension when indicated; immobilization and fixation by apparatus for holding spine and for keeping weight off the diseased bone. Tonics and general hygienic care are indicated.

QUESTIONS.

Define and give etiology, pathology, and treatment of periostitis.
What are its symptoms?
Define and give symptoms and treatment of dactylitis.
Define arthritis, and give the symptoms, prognosis, and treatment.
What is the active cause of morbus coxæ?
Give the pathology and symptoms.
How is it treated?
Define Pott's disease.
Give the symptoms and treatment.

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